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THE LEASTS OF GOD

BY ZERO

AUTHOR OF "LEAVES FROM THE DAIRY OF A HINDU DEVOTEE."

PUBLISHED BY
SUDHIDNRA NATH VASU, M.B.,
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PREFACE.

These spiritual exercises, type-written by me in 1917 and 1918, primarily for my own use, were re-arranged and revised subsequently, when the Editor of the Sacred Books of the Hindus issued by the Panini Office undertook to publish them. He has corrected the proofs and seen the book through the Press. The copyright of this publication, as well as of a previous one, for which he was responsible, belongs to him.

He has asked me to write a Preface, and all that I need do is to refer the reader to the Table of Contents, compiled by me, and to state that I had three objects in view. The first of these was to realise God by means of the marvels of Science, the second, to draw lessons from the facts disclosed by Science which might enable me to see God every where, and the third, to build a conclusion on those facts, taken *cumulatively*. Each Science is but a fragment of truth, and I tried to piece together the fragments, in order to see whether what I had learnt from Guru Nanak, as to God being the humblest of the humble-a-servant of servents and as to the spiritual necessity of becoming a "least", that is, non-egoistic, like Him, in order to see Him everywhere, had the support, direct or indirect, of Science. The result is now before the public.

Silvanus P. Thompson says in his book on Electricity, (Para 387, Edition of 1915): "It seems absurd that there should be two different units of electricity, still more absurd that one unit should be thirty thousand million centimetres per second greater than the other. It also seems absurd that the dimensions of a unit of electricity should have fractional powers. These irrational things arise from the neglect to take account of the properties of the medium in applying the law of inverse squares to form definitions of the unit of electricity in the electrostatic system, and of the unit-pole in the magnetic system." There is something higher than the Æther of Science, and we neglect to take account of Its properties, and feel, therefore, involved in apparent absurdities, worse than any of the above. But, in neither case, are the apparent absurdities real.

Ruskin has said in his Frondes Agrestes that "a great Idealist never can be egotistic." Why? "Because the whole of his power depends upon his losing sight and feeling of his own existence, and becoming a mere witness and mirror of truth."

Idealism, Faith, Hope, Charity, Freedon, Independence, Invention, Discovery, Intensity of Life which is Intensity of Helpfulness, and the highest Communion have become possible to us because of God's *non-egoistic* omnipresence which identifies itself with our *egos*. At one time, Science thought that a positive electric charge really attracted the negative charge that was near it, but now it has discovered. says the book quoted above on Electricity, (Para 6), that "both are urged toward one another by stresses in the medium in the intervening space", and that "effects which appear like a repulsion and an attraction between bodies at a distance from one another, are really due to actions going on *in the medium* between them." If Science only realised the paradoxical character of its Æther and the many parts played by it, would see nothing to laugh at in the claims of Yoga, or the experiences of Mystics, or the testimony of the saints and seers of all lands.

It is admitted there is electricity in the human body. The beating of my heart sets up electromotive forces. Normal muscle, when active,

shows a current from the active part to the resting part. Injured muscle at rest shows a current from the injured toward the uninjured part (returning toward the injured part through the galvanometer). In the skin, there is an electromotive force from without inwards. When light falls upon the retina of the eye, an electric current is set up in the optic nerve. (See Para 273 of the book quoted above). Yoga merely claims that when God's light falls upon the retina of the inner eye, a steady met-electric current is set up in the subtle optic nerve, which reveals more than the outer eye or the microscope or the telescope or the spectroscope can reveal. God's light falls upon that retina when we are non-egoistic.

Science underrates the power of the emotions, and yet one has only to hear a Bhakt, singing to his Beloved with infectious rapture, and ordinary humdrum Church music, to understand the difference between what is emotional and what is unemotional. We speak of thrills, and yet we can make nothing of a Nanak or a Francis of Assissi. There is a vast difference between uttering God's name with deep love, and uttering it in a conventional way. There is also a vast difference between profound meditation and mere reflection. Science has yet to explore the depths of love and the depths of meditation.

James Hinton has said: "The possibility of love is given to us in our power of sacrifice.....Our feeling it as pain proves something wanting in ourselves.....In the presence of pain the basis is laid of an exquisite delight...without endurance, life ceases to be enjoyable...Incessantly man aims at ends which do not involve self-abandonment; in-cessantly they are denied to him; or, when gained, deceive his hope.....Our ends are most subserved when most we feel them set at naught, for our destiny is higher than we know." Even the "something wanting in ourselves"—even imperfections have their uses, for we read in the "Stones of Venice": "The foxglove blossom,—a third part bud, a third part past, a third part in full bloom,—is a type of the life of the world...All things are literally better, lovelier, and more beloved for the imperfections which have been divinely appointed, that the law of human life may be Effort, and the law of human judgment, Mercy." Ruskin might have added: if there were no imperfections there would be no humour, if no irrational things, no ratiocination and no rationalisation. We want more love, more meditation, more feeling for the beautiful, the true, the great and the good, more respect for the Unseen in Nature and in Man, more loyalty to our faith in our acts, more steady perseverance. We are not "magnetic mockeries" or "cunning casts in clay." The more we exercise our inner eye, the greater will be its strength. The more we love, the greater will be our sacrifice and the sweeter our joy. The Omnipresent is within our inner Æther (the Antarakash). Let us realise Him through His "leasts", and become "leasts" ourselves, by utter self-giving and thorough faith and love, remembering always:

"In Love, if Love be Love, if Love be ours:
Faith and unfaith can ne'er be equal powers:
Unfaith in aught is want of faith in all."

ZERO

29th August, 1920.

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The "Leasts" of God

OR

AIDS TO MEDITATION.

CHAPTER I.

How beautiful, my soul, is the work of Water on this Earth! Why is that work great and godlike? Because water knows how to make itself small, and, thus, enter every pore of Earth, and every pore of all that is on or in the Earth. Fire can make itself smaller even than water, and Air can make itself smaller even than Fire, and Aether can make itself smaller even than Air: and the greatness of each is in direct proportion to its power to make itself small. Similarly, the greatness of every man is in proportion to his faculty of making himself small, in proportion to his faculty of penetrating and permeating. All the prevasive powers around us teach us this lesson, and Nature, it has been said by an American sage "shows herself best in her leasts" and to an English sage "the least of things seemed infinite." It is her "leasts" that keep our heart and lungs going. It is her "leasts" that do all the great work in our bodies which cannot yet be trusted to our volition. It is they, again, that enable us to invent. To reach them you have to become a "least". That is what is meant by the Seers, when they ask you to become as a little child, nay to become as dust. It is not enough to be free from Egotism. Thou hast a soil, my soul. Get you a weeder, a plough and a pump. Remove all the rubbish, dig deep into yourself and drain it of all Egoism. Happily the Plenum yet may then flow into the Vacuum. Nay, you may even find that you were always the Plenum, though covered over with debris and dirt!

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Your preliminary spadework should never be neglected. Remember again and again, that it is not enough to get rid of Egotism, of Pride, of Vanity, of the Lusts of the Flesh, the Lust of Fame and the Lust of Power. These are all expressions of gross Egoism, but there is a subtle Egoism, not easily detected or overcome. It creeps into duty and lurks in disinterestedness, even in spirituality. It is the offspring of Unreason (Avidya), and has for its children Attraction and Repulsion. (Rag and Dwesh), fear and Hope (Abhinivesh). Our "propensions and aversions", with their brood, envelop us in their deep meshes, and our five out-going senses, helped by their friend, the outgoing mind, are often too strong for our solitary Reason. You may wish to live an ideal life and a beautiful life. But Egoism manages to mix itself up with every wish. It can be swept away only by a tide of unitive ecstasy, a moment of which is worth an age, ecstasy acting as "Open sesame to the spirit". But such tides can come to thee only when you have completed your spadework and made yourself a "least" of God, and accustomed yourself to communion with the aid of all that Science can teach, with the aid of all that inspired poetry can teach, and with the aid of all that the great Seers and Saints, mystically united with the Lord can teach. Make use of all the three to see His Truth and Beauty and Goodness, and fill yourself with Love and Worship and Rapture.

Spiritual spadework takes many forms. You know an infant who was in the habit of sucking his left thumb. He grew up and the habit grew with his growth. Remonstrances and other means proved vain. But, one day his mother's mother (his mother was no more) appealed to his vanity. Two of his upper front teeth were slightly bulging, and she said to him that his bad habit was the cause, and if he did not improve they would bulge more, and he would look like a monkey. That appeal proved successful. Thus vanity has its uses, so has every frailty, every folly. There is none of them which cannot be used in the childhood of the soul as a lever, a wheel, a pulley, an inclined plane, a wedge or a screw. That is one of the meanings of the saying that the disease of Egoism contains its own cure. In the earlier stages, you can set one of its thieves to catch another of them. You can even use one of its many workshops for making your weeder, your plough and your pump, and gradually master and bring into play the great science and art of mental, moral and spiritual Dynamics. "Through the sense" says Stopford Brooke "we lose the sense, through the visible we enter the world of the invisible."

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There is also another meaning given to this saying, namely, that the little 'I' of man should be sublimated into the great 'I' of God, that the human Ego should be identified with God, by means of repeated suggestion, and such sublimation, such identification, will necessarily do away with human Egoism. But ancient teachers did not impart spiritual science to the proud: they demanded meekness and humility, and without these, my soul, you can never hope to enter even the outer Court of God, far less master the sciences of spiritual mechanics. It is far better for thee to commence by thinking thou art of low caste for not remembering God every moment of your waking life, than to commence by thinking you are God Himself. That wine may suit those who have worked harder than yourself and are more qualified. It is not for thee, at present, for thou art not yet strong enough to stand it. Thou hast thy ebbs and flows.

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Be humble, then, and learn to stand four square to the winds you are likely to encounter. Mechanics speaks of couples which produce a twisting motion, and it teaches that a body can be in equilibrium only when the resultant of all the forces acting upon it in one plane, is zero, and the forces do not constitute one or more couples. In your very first stage of spiritual progress, make use of this important lesson, and when you are acted upon by temptations, let your reaction be equal and opposite, and let neither pleasure nor pain, nor any other pair, warp you from the Living Truth or turn you away from the Transcendent Beauty of God. Remember, every upward direction is spiritually positive, every downward direction is negative. On every one of the infinite particles of your body, the Earth is exerting an infinite number of small, like, parallel forces, all vertically downward, which are equivalent to your weight in the physical world and make up the total force with which you are physically attracted to the Earth. But your body is able to withstand the pull of the Earth, though it is Earth-born, just as the Earth is able to withstand the pull of the sun, though it is Sun-born. But it is not enough to be merely in equilibrium with earthly force. ao many physical facts have been found to have their psychical counter parts, that it is safe to assume a general correspondence, on account ofboth sets of facts having a common denominator. It is safe, therefore, to assume that you have a spiritual power of resistance commensurate with

the forces dragging you down. The greater the mass of your body the greater the attraction of the Earth. Similarly the greater the mass of your soul, constituting its true value, the greater the attraction of spriritual forces, giving you your power of resistance and your power to move upward. If you can increase the mass of your body and your physical weight, you can also increase the mass of your soul and your psychical weight, both too subtle to be measurable or ponderable with earthly instruments, but definite and definable psychically, Your body has a point at which its whole weight acts, in whatever position it may be. That is its centre of symmetry. Similarly your soul has its centre of symmetry, at which the whole of its power to soar high acts, in whatever position the soul may be. Find it by making various experiments to increase your psychical weight. If your body possessed no mass at all, attractions would be zero : if your soul possessed no mass at all heavenly attractions would be zero. You can convert the former into zero, also, by increasing the latter to infinity. That is the most positive method of doing away with Egoism. It means dilating the soul " enrapt, transfused into the mighty vision ". It means flooding yourself with the joy of the Lord.

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Earthly attractions have their centre and heavenly attractions have their centre. The force of each (speaking materialistically) varies inversely as the square of the distance. The greater, therefore, your distance from the heavenly centre, the less will be its power to attract you to itself. Lessen, therefore, the distance. Accelleration is as much feasible as retardation. Use every moment to move upward. " Equal movement in opposite directions cancel each other. " Do not allow yourself to be rotated, or made into a shuttlecock. Find your centre, by becoming a "least" of God and concentrate your strength in order to move in the direction of the heavenly centre. Bring into play all your energy actual and potential. Have a determined will, an invincible will. It will give you the necessary leverage provided you make firm faith your fulcrum. Combine humility with a determined will. Humility will then be your " incline plane " for rising higher. Double it and you may have a wedge for directld piercing the toughest problems ; turn it into a fine active thread and youy may have a serew for winding your way through such problems and understanding all spiral and " staircase effect. " Similarly, you can make out of your spiritual lever of love, a wheel and axle, and a pulley, the former for coiling round and round everything pertaining to the Beloved, the latter for turning freely about, and looking at him from all points of view. Let all your thoughts and feelings, all your studies and acts reinforce your will and your faith, and increase your humility and love. You know you cannot answer satisfactorily even a child's question : let that fact teach you never to be self-assertive, never dogmatic, never intolerant, never fanatical. Cover all you see with the Lord, in accordance with the ancient teaching of ths Ishopanishad. See him in the Infinitely Great and the Infinitely Small and be at peace with all : your exertions may, then, bring you the joy of the Lord, and do away with your Egoism. Then, with bliss ineffable, you may feel

> " the sentiment of being spread
> O'er all that moves and all that seemeth still,
> O'er all that, lost beyond the reach of thought
> And human knowledge, to the human eye.
> Invisible, yet liveth to the heart."

The positive method finds its natural complement in the eliminative method : for there is sure to be friction between the body and the soul and that friction ought to be reduced to zero, for the sake of your spiritual efficiency. That friction will be at its maximum when you begin to move upward, and it will limit all your efforts to do away with your grossness unless you resort to earnest meditation and saintly society, and study the Great and the Good, and fill your mind with their examples, and with the best parts of your scriptures and all beautiful poetry, and, generally, make a right use of your time, powers and resources in order to see your Beloved in the whole of nature and in heart of man. By these means, you may succeed in purging the chambers of your memory, intellect and emotions so effectively that, neither during waking hours nor during sleep you will forget His Presence or his gifts of Truth, Beauty, Goodness, Love and Freedom. The rate of change of your spiritual momentum, will be proportional to the force you exert in this direction. Exert it fully so as to be free from spiritual ebb and flow.

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You cannot worship Beauty in Truth or Truth in Beauty or worship anything, without both activity and passivity. These are the two poles of worship both essential to it. Worship is starved without activity. Its effects are never assimilated without passivity. You have to be both positive and negative. You have to work hard to bring the necessary offerings of love and sacrifice to the altar of God within your heart, and then you have to lay yourself out for receptivity of His influence. How does a piece of coal become a diamond ? Can the body ever do without repose ? Can it retain health or sobriety without sleep ? There need be no quarrel between Activity and Passivity. In the world of Relativity both are necessary to thee, my soul, as they are to the body. Only move in God and sleep in God for thou livest in Him and hast thy being in Him in the mighty and yet humble self-denying Lord of Beauty and Truth and goodness the All in All.

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Remember this especially, my soul, when you encounter what you take to be Unreason, thoughtless Unreason, militant Unreason, or malignant Ureason. It is merely a background, and even a background has its own Truth and Beauty for an eye steadily contemplating the purpose it serves, and appreciating contrast and their use. Unreason is also as iron ore, which after it is passed through the furnace of life-after it has its heatings and hammerings and "baths of hissing tears", becomes a hardner, invigorator and innervator of all our flabby fibres, the material of our strength, and an enricher of our virtue, science, art and literature. Like the humble earth, humbled Unreason, gives us beautiful flowers and fruits and most precious gems. Let not, therefore, even unreason, make thee forget the presence of God, and where God is present, canst thou fail to see Truth and Beauty and Goodness ?

* * *

Discontent with thy own lot is a part of Unreason,which thou canst turn to good account if thou takest a leaf out of the book of iron smelters. Strike while the iron is hot. Let the iron even enter thy soul : it will be a source of energy, a power for good. You once saw a majestic water-fall : was the water contented with itslf when it jumped from great height ? But that waterfall is a source of electric energy Make it thy teacher. Nay make, every shock of doom thy teacher, and see the God in every one of thy teachers. Is not God present in every true

Guru, and is not Misfortune a true Guru ? Co nmune with Him, therefore, in every misfortune. He is marching on, and He is the cause of all Beauty and Truth and goodness.

* * * *

Millions died during the great war, millions die in peaceful times, and there are philosophers who think ill of thee, Beloved, because of so many deaths. Their complaints are useful, for they lead to research, and research is demonstrating Thy goodness and convincing, in a much larger measure, even the scoffers, than if there had been no complaints. Burning or burying the dead or exposing them in the Towers of Silence does not destroy the personality. It survives such destruction of its physical vehicle. Research has proved that " the dead are just as vivid and active as those still in the body ", that " death is but an episode in continued existence, and that the interest and enjoyment of life after death exceed what has been experienced here." This is the deliberate opinion of Sir Oliver Lodge, who says he is " absolutely " satisfied that existence is not limited to this present life on earth, " that death is an interesting adventure, and usually it is not a painful episode." " Recovery from an accident or from unconsciousness the ' coming to ' may be painful, but the passing away usually is not." Numerous bereaved persons are able to get into touch with their loved ones and receive messages of affection and identification with characteristic touches appreciable only by them, and facts not otherwise known to them but fully confirmed by their enquires and investigations. Then there is the system of correspondence whereby one mind was proved to be purposely and systematically acting on a number of independent mediums unknown to each other."

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Why is then death in this world ? Why is there Unreason at all in this world ? Why is there Evil in this world ? Why should there be darkness here or even twilight ? As well ask, why there should be Relativity at all, why then should be growth or development at all. There is Unreason in every child under seven. There is less of it in one under twelve still less in a youth under eighteen. Thus Unreason in a child is but Reason in the making, so is it in the world at large. Do you think mothers and fathers, brothers and sisters would feel very happy with a little bookworm of two or four, whose Reason is mature, who cares not for play, who resents a caress as a sign of weakness, and looks down upon those who try to fondle him ? Similarly this Earth is but a little child, and she has her parents and brothers and sisters and playmates, all of whom would feel a great gap in their hearts if she ceased to claim their care, help and affection. There is not even a speck of dust which is not, connected with something else : all things are inter-dependent, my soul and their author knows more than they what is good for them. Have faith, then, and bide thy time. If a chi'd cannot understand its own birth, how can you expect to understand the birth of all things, and the reason of their birth ? Have faith, and be patient. Do not be eaten up by egoism. Surrender thyself. Make thyself as dust, and thou wilt be lifted above thyself. Die while living and trust thyself to Him. That is the teaching of all the great teachers of humanity. Do not despise that teaching. Unless you learn that lesson and practise it, you cannot grow either in Truth or Beauty or goodness. Until you learn to disindividualise yourself, you can never understand Nature, which is the Art of One Who has disindividualised Himself, and you can never understand the Lord of

Nature, or those inspired by Him. If you wish to know the All-in-All, you should become one of His 'leasts.'

* * * *

How could imperfection like ours have sprung from Thee, the Perfect One ? Some say that what we call imperfection is merely an illusion, a dream, and exists only as so many things exist in our dreams. Why are we mere dreamers then ? Others say that Thy whole cosmic book is not before us, nor the context of the fragment actually before us, and what we call imperfection may not be imperfection at all. But why then are we allowed to see only a fragment of Thy book. A third set of thinkers say that we do not really exist, that we are not, and naught is ours, and Thou alone existest, Thou alone proposest and Thou alone disposest. Are those thinkers then Thyself or is there a difference between Thee and them ? A fourth class say that Thou art not all-powerful and have to contend against a rival. But we refuse to believe that our God is not omnipotent. A fifth class say that Thou art omnipotent, but have willed that there should be a struggle between Good and Evil, and that Evil shall we eventually overcome, even in this world, and Good shall survive. A sixth say that Good survives and rules supreme in the next world. A seventh class say that Thou wishest to share Thy blessedness with others to whom Thou hast given the power of development from imperfection into perfection. Quite different is the "Neti Neti" of those who become Thy "leasts" who do not rely merely upon their intellect and who doing away with egoism rise above all Relativity. Make me then, O Lord, one of such " leasts".

* * * *

If this little world, my soul, had not its imperfections, would it be possible for Thee to do even the slightest perfecting work in it and to get all the training thou needest, in the pursuit of even thy own ideals of Truth, Beauty and goodness ? Shankara predicted in his Commentary on the Brahma Sutras that a day would come when the sun would not rise or set for us but would be known as the centre of our world. Astronomy has fulfilled that prediction. A day may also come when our sister planets will disclose to us their secrets and be in communication with us. Nay a day may come when, the centre of all the solar systems, of which ours is one, will become known to us. But even then, it will not be possible to attain to even a rough general view of the cosmos as a whole, far less to attain to an analysis of all its elements or to a synoptic view based on such analysis. The Timeless has his various worlds and time-processes for the training of free souls and for their perfection and the perfection of their environments, and there have been philosophers (for example, Malebranche and Lessing) who have preferred the Pursuit of Truth for its own sake to even the Truth itself, and there are others in the modern world, who would rather give up the Beatific Vision itself than free activity in the realisation of their ideals of personal worth, in the promotion of the spirit of good-will, of righteousness and of truth, in the lifting of humanity out of the mere chain of cause and effect, in the establishment of a " realm of ends " in the kingdom of Nature, in the creation of moral, æsthetic and intellectual values, values intrinsic, organic, universal, comprehensive, unconditional, permanent, independent of external circumstances and yet of objective validity, in short, in the spiritualisation of Blind Matter. Have faith, my soul, in Him, the source and conservator of all these values, of all eternal verities and of all inspiring ideals, in Him who is the harmony of the Natural and the Spiritual, the Actual order and the Ethical order, the harmony of

"what is" and "what ought to be," the common centre of reference of the whole cosmos.

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What has put my spirit into this cage? whence comes the force which makes me follow the trend of my nature? Whence comes that trend itself? Why is it that some are able to be still and know, to shift their "field of perception" to go far ahead of the Bergsonian cinematographic films the senses give us, to become "all eyes" or "all wings", while others are like the little creatures we see in shallow water on a sea-shore laboriously dragging along their shell and putting forth their tentacles, towards sand or slime? Why is it that some are immersed in fleshly love, others in supersensual love? Why is it that some have merely a surface consciousness and others a transcendental one? Why is it that, some have a core of personality where "God and man initially meet," where static and dynamic life become one, while others wallow in mud of their senses? In the world of Relativity nothing inborn or acquired escapes transmission, for Weismann is not believed in either by doctors or by breeders. The earth has seen many changes, and it has yet to see many more, but nothing has been annihilated. Cosmic Light shining on Dust makes it a vehicle of Life, and makes Life a vehicle of Intelligence, and Intelligence of Bliss. The first plant and the first animal did not put an end to the past life of the molecules of which their gross bodies were composed, for Continuity is a law. There are problems not yet solved, and there are ebb and flow, but there are sufficient grounds for faith. Lose not thy faith, my soul!

* * * *

I am a cognitive and conative being. My reason is both theoretical and practical, and I can never do without faith. Conation is its source and it has been said that every forward step in the progress of life has been an act of faith, an act not warranted by knowledge on the part of the pioneer who first made it.

"There was little for example, in all that the wisest fish could know, to justify the belief that there was more scope for existence on the earth than in the water, or to show that persistent endeavours to live on land would issue in the transformation of his swim-bladder into lungs. And before a bird had cleaved the air there was surely very little, in all that the most daring of saurian speculators could see or surmise concerning the untrodden element, to warrant him in risking his neck in order to satisfy his longing to soar, although when he did try, his forelimbs were transformed to wings at length, and his dim prevision of a bird became incarnate in himself.....In keeping with the great principle continuity, everywhere displayed in the working out of the world's evolution, we have found this faith foreshadowed in the upward striving that is the essence of life. Consider for a moment the development of the senses. The first clear response is to mechanical contact, and we have as the first specific sense the sense of touch. From this it is presently differentiated the sense of hearing, when objects not yet present to actual touch give premonitions of their proximity by the vibrations they set up: hearing is thus the faith of touch. As hearing to touch, so smell stands to taste: it is a foretaste that, further extends the objective range. A freckle or pigment-spot is all that light at first produces, but when its hints are heeded and the pigmented retaina that first arose is furnished by the organism's own prophetic efforts with directing muscles, it exchanges its passive sight for active vision, and opens out a vastly wider objective world. In keeping with all, this is the place of faith on the higher plane where it contrasts with intellectual sight: it is like a new sense that brings us face to face with an unseen world..... Faith is striving and striving is faith."

These are Bergson's words and Science accepts him as its philosopher. Strive then with all thy strength, my soul, to find him who is Love, who wants no glory, and who has imposed limitations on himself to become the ground of this world and to make love its final law.

"The only worthy object of love is just love : it must then be a world that can love God. But love is free : in a ready-made world then it could have no place. Only as we learn to know God do we learn to love Him : hence the long and painful discipline of evolution, with its dying to live-the converse process to incarnation-the putting off the earthly for the likeness of God."

* * * *

Molluscs sitting in judgment on human stars of purity and beauty ! Such are we, when we judge Thee. Misery and sorrow and pale death ? Yes, but what do we know of their virtue ? Can the echinoderm understand the Eagle ? Can a coward undertand Hercules ? There are complementaries, we little understand, there are compensations we little understand. There are whole worlds of beauty and heroism we little understand, There are things bringing forth their opposites, in spite of our earthly heredity and environment (as commonly understood) There are Helpers, we know little of. What said that wild pomegrnate-flower, Balaustion :

'Gladness be with thee, Helper of our world ?
I think this is the authentic sign and seal,
Of Godship, that it ever waxes glad,
And more glad, until gladness blossoms, burns
Into a rage to suffer for mankind.
And recommence at sorrow : drops like seed.
After the blossom, ultimate of all.
Say, does the seed scorn earth and seek the sun ?
Surely it has no other end and aim.
Than to drop, once more die into the ground,
Taste cold and darkness and oblivion there :
And thence rise, tree-like grow through pain to joy,
More joy and most joy, do man good again."

Forgive O' Lord our chaotic reasonings and our foolish scepticisms. Forgive our weaknesses of head, heart and conscience. Give us Thyself.

* * * *

Do not believe, my soul, that the only light thou hadst is the light of sense. There have been men who have borne testimony to the great fact that when the light of sense goes out, when the mind is hushed in such repose that nothing external has power over it, there comes a flash revealing the invisible world, even a flash in which Space and Time are nought, a flash in which primary and secondary qualities are nought, a flash in which substantives and adjectives are nought, a flash in which Relation and Quality are nought, a flash in which all the operations of the intellect are nought, but there is a feeling, a rapturous feeling, a feeling of the joy which transcendent Beauty gives us, a feeling of self-forgetfulness in which the splendour of Truth and the splendour of Goodness shine on us as Beauty, and we truly lose ourselves to find ourselves. That feeling explains those great apophthegms of the Yoga Sutras, in which the suppression of the waves of the mind is insisted on, and the waves are classified so as to oleave alone the world of feeling and ecstasy, the world of "gleams like the flashing of a shield", the world in which the heart cannot sustain

beauty of which it gets a glimpse, the world in which, under the excitement of beauty, our whole being is rejuvenated, the world of mystic intuition, which is higher than the world of the poet and far higher than the world of the scientist.

* * * *

How do we apprehend the outer world ? How do our organs of sensation respond to outer stimuli and pick up messages of all kinds except what may be called the subliminal ones ? Is it possible to pick up the subliminal ones and suppress the painful ones ? Sir J. C. Bose at the first anniversary meeting of the Bose Institute startled his audience by announcing that his well known theory of the unity of life reactions had been confirmed by a marvellous experiment. The preliminary experiments which led to it were conducted with the primitive type of nerve he had discovered in plants, the final one on an animal nerve. " Under a particular molecular disposition, the experimental frog perceived and responded to stimulus which had hitherto been below its threshold of perception. Under the opposite disposition, violent tetanic spasm caused by the irritant salt applied to the nerve became at once quelled. Thus by the control of molecular disposition of the conducting nerve, the nervous impulse, and the resulting sensation may become profoundly modified. It is claimed that there is a latent power in man by which he can, at his will, widen the channels through which the outside world reaches him, or close them when it is inimical or painful. It is claimed that, without the use of any narcotics, or supernatural means, a man can withdraw within himself, " so that in his inner realm, the jarring notes and the din of the world should no longer affect him". It is claimed that he can catch the indistinct messages which have hitherto eluded him, that the external need not dominate him, and that he need not be merely passive in the hands of destiny. Everything depends on the disposition of certain *leasts* within him, and if there is a proper disposition of them, nervous impulse can be exalted, inhibited or obliterated.

* * * *

What are the moments worth ages ? They are the moments in which we dip our oars in the silent lake of the soul, "unstained, clear and crystalline" and in which the world is not with us, waking or sleeping, but a Presence which is not to be put by. They are the moments in which spiritual sunshine is added to daylight, and we have sight of the River of Life, connected at one end with our lake, and at the other with

" That immortal sea
Which brought us hither."

They are the moments in which the mind not merely transfigures the obstacles in its path, like the moon incorporating the umbrage intercepting its beams, but is flooded with light divine. They are the moments which the soul realises most vividly that it lives only when it loves, and when abundant overflowing love breeds that self-abandonment, that self surrender, that utter self-forgetfulness, that non-egoism, in which the soul goes unconsciously but most constructively from strength to strength and feels there is no limit to its potentialities. They are the moments when our second birth, so to say, gives us a new insight, an insight into the full meaning of Nature and humanity, when all the revealing agencies in both are in full operation, and finishing their work, make us feel the magic of the Spirit of Paradise and intoxicate us with the spontaneous effluence of that spirit, the Spirit of Love.

Is it impossible to draw out from Nature Him, who,

"through all diffused,
Sustains and is the Life of all that lives,"

Him who subsists

"In all things, in all natures, in the stars,
Of azure heaven, and unendurings clouds,
In flower and tree, in every pebbly stone,
That paves the brooks, the stationary rocks,
The moving waters and the invisible air."

Him, the soul of all the worlds, who circulates from link to link, in every cell, in every atom, in every electron, in every met-electron, in every soul. Is it impossible, to compel the gross and visible frame of things, and the subtle and invisible frame of things in the region of the mind to relinquish their hold upon us? In his "Theology in the English poets", Stopford Brooke says this is not only possible, but Wordsworth had that experience, and he adds:

"It is an experience many of us have gone through. It comes chiefly when the incessant small noises of nature make less attack upon the ear, when we are high up on a mountain side, or when we sit at night by the sea when the low mist seems to hush the water into silence, or when in deep noon one sound alone, like the wandering voice of the cuckoo, smites on the ear."

The true poetical mystical lover of Nature then seems to float apart from the body—the outward world is not felt, but only the life which inspires it". "Nature seems all unsubstantialised" and "we are forced to go to a tree to touch it, in order to realise that it is tangible.' All the sensible images are turned into such vivid ideas and emotions "that they push the sensible things which awakened them out of the field of our consciousness". Tennyson had a similar experience when he wrote:—

"And more, my soul for more than once when I
Sat all alone, revolving in myself
The word that is the symbol of myself,
The mortal limit of the Self was loosed,
And past into the Nameless, as a cloud
Melts into Heaven. I touch'd my limbs, the limbs
Were strange not mine-and yet no shade of doubt,
But utter clearness, and thro' loss of Self
The gain of such large life as match' d with ours
Were Sun to spark - unshadowable in words,
Themselves but shadows of a shadow world."

This gives you an idea of what non-egoism means. Let the egoistic philospoher create his 'values' in this world and rejoice. Let the non-egoistic try to ascend beyond Relativity, beyond ebb and flow, through the crucifixion of his self. Let each play his part. There is God in both in the West as much as in the East, in the practical and pragmatic as much as in the idealist and mystic.

* * * *

Ebb and flow—flow and ebb are within thy experiences, my soul. Be not discouraged. The Lord knows what is best for thee. Say to Him, "Thou art the Ocean, and all things are in Thee." Ask Him to save thee from thy egoism: the Crocodile that caught the Elephant typifies it. Ask

to be saved from this Crocodile. Still the heavings of thy heart, and wipe thy tears. Be not discouraged, my soul, if thou art not heard at once, increase thy faith and pray again. If insulted, suppress thy egoism. If patted on the back, then also suppress thy egoism. Welcome all. He sends thee and trust thyself to Him. Thou art being tested. Fail not again and again.

* * * *

Ebb and flow —and bubbles ! The earth hath its ebb and flow and bubbles as the sea hath ! And they are in thee , also, my soul, when thou art egoistic ! Thou longest for that bourne, where they are not, the bourne from which they are separating thee. Turn, my soul, to Him, who is the organ in thee of all thy feeling of freedom, of all thy power of self-determination, and use the feeling and the power to throw off the bonds of the out-going senses and their objects, the bonds of Matter and of its laws, and the bonds of thy secular antecedents. Throw off those bonds, and you may be admitted to worship at the inmost shrine in thee of Truth and Beauty, and goodness, the Shrine which knows no instability, the Shrine uncontrolled by Time, Space and Causality, the Shrine whose incorporeal existence even in the poorest and the most ignorant makes them equal to the richest and the most learned.

* * * *

Only that State can live in which injury to the *least* member is recognized as damage to the whole,—in which injury even to a child or the humblest labourer is considered as injury to the whole commonwealth. Alas how little has this great maxim been practised by kings, lords and commons, and how little has its spirit influenced private life ! Why is it that it has had little influence ? Because we ignore the Shrine within us—*the* Shrine of the one Lord—the one Magnet of all souls who knows no change and no inequality.

* * * *

The penetralia of that Shrine cannot be discerned except by disindividualisation.

Disindividualise yourself by deep love of Nature and God. Such love will enable you to eliminate your consciousness of material forms and their names, and to enter into close communion with Him who

> " Warms in the sun, refreshes in the breeze,
> Glows in the stars, and blossoms in thë trees,
> Breathes in our soul, informs our mortal part,
> As full, as perfect in a hair as heart".

* * * *

To the ancient Vedic Rishis to saints and seers in all lands, and even in modern times to reverent poets like Emerson, Wordsworth, Tennyson and Browning, God spoke through their souls and through Nature. Like them, learn my soul, te see His face in every man and woman, and in "the common people of the fields and hedgerows—the daisy, the celandine, the daffodils, the primsrose and the snowdrop" and even in weeds and grasses, which though despised, have been found full of healing qualities. The poet Crabbe rode sixty miles in twenty-four hours for a sight of the sea, and the sea is visible to you every minute. Let it help you my soul, to catch a sight of the light that never was on sea or land, to catch a sight of Him who, alone "spreads undivided, operates unspent." Who, alone, though " changed through all " is "yet in all the same " the Life of lives, the container and sustainer of all, the source of the oneness of life in " all

things thinking, and all objects of all thought". Love man and bird and beast for His dear sake, see his matchless pencil in the forms of even the streaks and shadows of flowers in woods and groves, in clouds and lakes in every mode of being, and let thy love grow into adoration. Be entranced in meditation, be ravished with His beauty, in utter self-forgetfulness, and Nature will then be an open book to thee, and your love will light up the world with its own glory, and your heart will communicate its own liberty and independence and its sense of "the self-sufficing power of solitude" to other hearts and tell them of Him Who is

> "the light in sound, the sound-like power in light,
> Rhythm in all thought, and joyance everywhere."

CHAPTER II.

Analysis and Synthesis.

Is it possible to cover all you see with the Lord? Analyse and synthetise love and be a "least" of God. To analyse, resolve things into their least components. Remember, all the languages, and all the musical compositions of the world have grown out of a few phonetic elements. All these bulky Encyclopædias and Lexicons would be nowhere if there were no letters, and where would be Mathematics, if there were no digits, no points, no angles, all very small things? Nay where would all these words themselves be if there were no invisible electrons. no radium and no chemical elements? In all these 'leasts' there is infinity and indestructibility, continuity and solidarity, and, therefore, it ought not to be difficult to cover their combinations or products, permutations or transformations, with the Lord, even if they were not beautiful or sublime but how beautiful, how sublime they are the great poets and painters bear witness.

* * * *

It will help you in this pursuit to bear in mind that you are evolved out of infinity, permeated by infinity, and surrounded by infinity. Therefore, meditation on even the least of things leads to infinity. Look at the end of a small hair, and have its distance from your sight increased until you can say it has no magnitude at all but merely position, in other words, that it is merely a geometrical point. He who meditated on such a 'least' and knew it led to infinity, built up a science, which made Plato say that God geometrises. The Trigonometricians who garnering the results of geometry, meditated on the simple elements of a triangle, found that even angles had circular functions, that with the formulae relating to such functions they could calculate not only the momentum of a rotating ball or a falling apple but the force exerted by the sun and other heavenly bodies, that the sine and cosine curves were infinite, and were important in the consideration not only of the swinging of a simple pendulum, but in the consideration of harmonic wave motions in the infinite æther? Thus the least takes you to the greatest, the simplest to the most complex ! The beauty of truth lies in this its wide sweep, in the manifoldness of its aspects, and in the correspondences between the Outer and the Inner.

* * * *

We have experience of verticals and horizontals, almost every minute of our waking life, but we see little in their relations, while to the

trigonometrician they are eloquent. Take a horizontal and a vertical, and you can add a third side in which they meet, and form a triangle with innumerable circumscribed and inscribed and escribed circles and quadrilaterals and polygons ! You can divide every triangle into right-angled triangles, and make use of the pythagorean theorem and other theorems to arrive at equations determining the relation of sides to angles, of diameters to circumferences, and enabling you even to solve not only plane but spherical triangles and make important astronomical calculations ! The lengths of shadows of a vertical object deeply meditated on, enabled ancient astronomers to frame a table for solar altitudes ; and without the tables of logarithmic sines and tangents, there would be no Nautical Almanac !

There is an infinite series for the sine and the cosine, for the tangent and the secant, in powers of the arc , and how small is the arc of a circle ! But the arc is made up of idealised 'leasts', each of which is a home of infinity !

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Consider, again, how Mathematicians are able to compare rectilinear and curvilinear figures with each other, how they are able to ascertain the velocity of even flowing quantities of moving gases, of chemical reactions in various media under different conditions of temperature and pressure, how they are able to find the curve along which a body falls with uniform velocity, or that formed by a chain of uniform weight suspended freely from its ends, or that along which a body falls from one point to another in the shortest possible time, or th path of a projectile in a particular medium, or the shape of a rectangular sail filled with wind ! Surely by means of the Infinitesimal Calculus evolved by meditation on infinitely small quantities.

" Lines " said Newton " are described, and paths thereby generated not by the apposition of parts but by the continued motion of points, superficies by the motion of lines, solids by the motion of superficies, angles by the rotation of the sides ; portion of time by continual flux : and so on in other quantities. These geneses really take place in the nature of things, and are daily seen in the motion of bodies."

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The science of Mechanics, or as it is now usually called, Dynamics, considers it an indispensable preliminary to deal with pure motion, motion in the abstract, without any reference to what is moving or to matter or to force, but only to motion in time. It speaks of the degrees of freedom of points, the continuity of their paths, of evolutes and involutes, of velocities, their composition and resolution, of moments of velocities about points, of polar co-ordinates, of acceleration and its components, and, applying geometry and ths Calculus aud quaternions, states the form of planetary orbits, with a slight alteration, in terms of the focus and directrix property of conic sections !

* * * *

And how does Applied Mechanics work out its problems ?

It of course makes allowance for the materials used and the existing conditons and, after making that allowance and bearing it in mind, deals with the shiftings and turnings of points, their motions compounded of shiftings and turnings, and their velocity ratios and directional

relations, and with their aid, explains trains of mechanism and combinations in mechanism, connected by rolling contact, sliding contact, wrapping connectors, linkwork or reduplication! In hydrodynamics, again, what do we find at the bottom of all calculations? Equations expressing the motion of a fluid particle! What is the definition of a straight line? "The actual path of a particle." What is the definition of a line of flow?" A line such that the tangent at every point is in the direction of the velocity at the point."

What is the definition of a vertex line?

"A line whose tangent at any point is in the direction of the resultant spin that is molecular rotation of the component angular velocities at that point."

Smoke rings, vortex rings half vortex rings and even hydraulics would be very tough subjects if there were no such equations. For the purpose of calculation the movements which produce the phenomena commonly ascribed to fluid friction must be regarded as rapidly or even suddenly varying from one point to another, and "the internal resistance to the motion of the fluid do not depend on the general velocities of translation at different points of the fluid—but rather on the intensity at each point of the eddying agitation."

* * * *

You cannot understand Friction or the work of Energy without fixing your attention on points of space and observing the changes of pressure, density and velocity which take place there. You cannot understand the working of your own inner world without fixing your attention on Points of time, and making your attention one-pointed and concentrated. Think, therefore, of Points, when you want to realiz, omnipresence intellectually. Æther is said to be present even in the interspace between elactrons in an atom? God's omnipresence surele cannot be less than that of even æther.

God in the master of Mathematics, Pure and Applied, has been reading his own riddles! How truly has Principal Shairp said in his book on the Pœtic Interpretation of Natures.

"Any one who has ever been brought to meditate on the relation which the abstractions of mathematics bear to the Laws of Nature, must have felt how exceeding wonderful it is. A system of thought evoked out of pure intelligence has been found reflected and, as it were, embodied in the actual movements of the heavenly bodies, and bringing the whole Physical Cosmos within the power of man's thought.

From star to star, from kindred sphere to sphere,
From system, on to system without end."

And Wordsworth drew from geometry,

"A pleasure quiet and profound, a sense
Of permanent and universal sway,
And permanent belief—there, recognised
A type, for finite natures, of the one,
Supreme existence, the surpassing life
Which-to the boundaries of space and time,
Of melancholy space and doleful time.
Superior and incapable of change,
Not touched by welterings of passion—is.
And hath the name of God."

It is said about Wordsworth that,

"the same calm which was impressed on him by Nature, in which he felt the ineffable oneness of life..... he found again in the permanent and universal sway of law, that type of the supreme existence of God in whom all discords, untouched by passion, were harmonised and mingled."

* * * *

Noble, truly noble was that edifice which was built on the geometrical Point. Let that edifice help you to realise the Supreme in His "leasts" and the "leasts" of Nature to see splendour in the grass and glory in the flower, and to believe that in God, the Father of all "all men are one, equal, free, and brothers."

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The electrons of Science, the leasts of Nature par excellance, are embodiments, so to say, of "gross Points." They are not Geometrcal points. Science pictures "a primitive and all pervading Æther, without weight and energy" and it imagines the particles of Æther, if it be particulate, receive charges of energy, and becomes electrons. Silvanus Thompson, a priest of Nature, in his standard text-book on Electricity, tells us:

"All atoms are in fact aggregations of electrons held together by a nucleus of something that may be vaguely called positive electricity, around which or within which, the electrons are grouped in systems, probably revolving around in orbits as in a sort of utraminute solar system."

Never forget this! In every atom of thy body is an ultra-minute solar system even according to Science, a central sun with planets around it. If the solar system can place itself in miniature in every atom, if it can be omni-present, cannot God be omni-present? Believe it, my soul, the Lord is everywhere. He is veiled by that central sun in every atom, but He is certainly present, and as the Kenopanishad teaches and the Kathopanishad and the Mundoukopanishad, if he were not present, the sun would not be a source of light and life, the Air would not be Air and Fire would not be Fire. Inquire about the nature of light, and you are told that it is transmitted by means of transverse wave motions in the æther, that the wave-motions are of electrons, that the electrons are sub-atoms, minute negatively electrified particles, very many times tinier than the atoms, that they revolve in small orbits and produce electro magnetic waves by their oscillations, and that when their rate of vibration is increased by a high temperature we are able to sense them as light and radiant heat. Inquire about the nature of electricity, and you are told again electrons, but, it is admitted, no one yet knows what magnetism or electricity really is or how they are related to each other. Both can be produced and their properties and laws have been to a great extent ascertained. It is certain that atoms and sub-atoms play a great part in them, and science says that probably "electricity is the basis of the universe, while matter is but the form or manner in which our senses interpret it". The electrons, according to the latest researches, have revolutions similar to the revolutions of the planets about the sun, and subject to laws exactly analogous to Kepler's laws for the planets". We are also told that,

"the wave length and frequency of the wave motion constituting light require the period of revolution of an electron to be inconceivably rapid-many thousand of billions of revolutions in a second.

This co-ordination of Light, Heat and electricty eloquently proclaims the power residing in Nature's leasts, and enables you, my soul, to see its Lord in Nature.

* * * *

" Energy" it has been said, "is as it were, the informing spirit of Matter ". Every *visible* mass, according to Physics, consists of *invisible* molecules, in incessant motion, even though the visible mass is at rest. Every molecule has its atoms, and every atom has its electrons, and these come from æther which has neither weight nor extension, and which is neither Matter nor Energy. Heat is a form of kinetic energy possessed by the invisible molecules, and every mass which occupies a position above the surface of the earth has potential energy, the energy, for example, of a loaded revolver. Radiant Heat has been called " wireless thermal telegraphy ". It is latent even in things the most opaque and dark and has a mechanical equivalent. Electricity also, which has neither weight nor extension, resides in Matter, though it is not Matter. The æther fills all space even what we may consider the most vacuous regions, and the three forms of radiant energy, light, heat and electricity are its gifts to us.

* * * *

Clerk-Maxwell says that the molecules of matter are

"perfect in number and measure and weight and that from the ineffaceable characters impressed on them we may learn that these aspirations after accuracy in measurements, truth in statement and justice in action which we reckon among our noblest attributes as men, are ours because they are essential constituents of the image of Him who in the beginning created not only the heaven and the earth, but the materials of which the heaven and earth consist."

Like that great scientific Seer, Faraday, he saw lines of force traversing all space and like Mathematical Seers he saw centres of force attracting at a distance and he showed that the ideas of the former could be translated into the form of the latter and the ideas of the latter into the form of the former, and " that in general the results of the two methods coincided. Begin with the whole and you can arrive at the parts. Begin spiritually with the parts and you can build up the whole by synthesis. Analysis and synthesis give such results, because of Thy Unity, O Supreme.

* * * *

Would there have been a Science of Chemistry, without the concept of a point of an atom ? Worldly people may laugh at a man for trying to see God even in dust. But the atomic theory which is really as old as the Vaisheshika Philosophy, first suggested itself to Dalton when he was busy investigating the properties of marsh-gas and olefiant gas ! Even in light carburetted hydrogen there was a law working. He credited Nature with loyalty to Law, and he found that there were combining weights of ultimate particles of matter, and his successors have nobly carried on his work and found the atomic weights of all the known elements and their valencies and the law by which the atomic weight divided by the valency of an atom gives us its combining weight. What makes it combine ? Affinity.

* * * *

But whence this Affinity ? And why these monads, dyads, triads tetrads, pentads, hexads ? Why these acids and bases, and positives and negatives? Why are the physical and chemical properties of the elements, periodic functions of their atomic weights ? Marvellous is Gravitation. Marvellous is Chemical Affinity ? Marvellous are their

laws. But the scientist if he is a material monist, thinks that Matter and Energy are all in all, and that even his power of discovery and invention comes from them. The old Sankhya stands justified in part today. Its further teaching that æther itself comes from some thing more subtle which comes from consciousness and intelligence that æther was evolved because they were originally involved, may, one day be found to be equally true. And even those who believed in seeing God in all things and all things in God may one day be vindicated. Meanwhile pursue your efforts to practise their teaching. Believe with them that infinity lies hid in every point, in every electron, in every atom, in every molecule, in every element.

* * * *

"It was formerly thought", says Macgregor Skene, "that all matter could be ultimately resolved into a number of elements.... The brilliant researches of a group of Russian and English chemists and physicists on radium and its allies has proved this to be a false, or at least an incomplete view. These investigations, taken together with the results of observations on the constitution of stars at different temperatures, have shown us the elements, in various stages of evolution from simpler and common states."

"Light", says Dickson, "travelling through space at the rate of over 186,000 miles per second, and taking a litte more than eight minutes to reach the earth from the sun, takes three quarter years to reach us from the nearest fixed star. In most cases the time is to be reckoned in hundreds of years."

That gives us an idea of the worlds surrounding us ! Lockyer says :

"As we come down from the hottest stars to the cooler ones, the number of spectral lines increases, and with the number of lines, the number of chemical elements. In the hottest stars of all, we deal with a form of hydrogen which we do not know anything about here (but which we suppose to be due to the presence of a very high temperature), hydrogen as we know it, the cleveite gases (helium), and magnesium and calcium in forms which are difficult to get here ; we think we get them by using the highest temperatures available in our laboratories. In the stars of the next lower temperature, we find the existence of these substances continued in addition to the introduction of oxygen, nitrogen and carbon. In the next cooler stars we find silicon added ; in the next we note the forms of iron, titanium, copper and manganese, which we can produce at the very highest temperature of our laboratories, and it is only when we come to stars much cooler that we find the ordinary indications of iron, calcium manganese and other metals. All these, therefore, seem to be forms produced by the running down of temperature. As certain new forms are introduced at each stage, so certain old forms disappear."

Lambourne, the chemist, thinks that Lockyer's observations show how the elements were evolved from a single primordial element which was possibly of some such nature as the hydrogen "we know nothing about."

"Millions upon millions of tiny particles of such a substance would be shot off in all directions constantly, and, as they cooled, would unite in various agglomerations. The different ways in which these aggregations formed would be distinguished by different properties of the atoms of what we call elements."

But all molecules depend upon certain groupings of their atoms. What brings about those groupings ?

"Rise of temperature breaks up the molecule into the component atoms, and thus the spectrum at the higher temperatures is that of these atoms."

And hence the same elements will often give different spectra at different temperatures, and with many elements certain lines in the particular spectrum are enhanced. Whence came, then, the temperature which acted on the primordial element, according to such laws? Before Radium was discovered, the Sun was said by astronomers to have supplied the earth with heat for twenty million years, while geologists demanded a hundred million years! No one dreamt, then, that there was any atom containing an almost incalculable amount of energy, an atom emitting invisible rays which make fluorescent substances luminous, which make gases conductors of electricity, and make the retina phosphorescent. The alpha rays of radium are shot off at the rate of 10,000,000,000 per second from one grain of its bromide salt. The beta rays travel at the rate of 170,000 miles per second. The gamma rays pass right through the human body and through lead and iron.

"The alpha rays are slightly repelled from the magnet, the beta rays are strongly attracted, and the gamma rays are not deflected at all."

And whence comes Radium? From pitch blende! Take a ton of pitch blende, treat it with five tons of chemicals and you get just two grains of radium! Truly each atom of radium is a world within itself, with some properties of the Mathematician's Hyperspace. Never forget Him, my soul, Who places such worlds, even in the most unpromising materials.

* * * *

Do not build your spiritual fabric out of mere material weight and extension. What appears to have merely weight and extension, what appears gross, has a good deal within it which Science is only slowly discovering. Even a materialist like Hæckel found himself compelled to believe that atoms were endowed with sensation and will and had a soul. He also said :—

"The life of the animal and the plant bears the same universal character of incompleteness as the life of man. This is directly attributable to the circumstance that nature organic as well as inorganic—is in a perennial state of evolution, change and transformation. This evolution seems on the whole—at least as far as we can survey the development of organic life on our planet—to be a progressive improvement, an historical advance from the simple to the complex, the lower to the higher, imperfect to the perfect."

We are an infinitesimal part of a great Whole : but He is not absent even from the lowliest grass-not even from the minutest hair. Our own Sun, which has a mass about 324000 times the mass of our Earth, and is at a distance of about 193 millions of miles from us is yet, by means of his light, by means of his 'least', in daily, hourly communication with us. We occupy but a two thousand millionth part of the whole spherical surface of the sky known to us, and we get our allotted two thousand millionth part of the whole light which the Sun dispenses. We are not neglected or unfairly treated, though our planet is but a point in space.

* * * *

There are thing which you may not understand. But every law discovered enables you to peep into the mind of God, and hear partially the real music of the visible universe. John Newlands so heard it when he discovered his Law of Octaves after meditation on chemical elements, the law which Mendeleef called the Periodic Law. Arrange the elements in the numerical order of their atomic weights and you see a recurrence of similar chemical and physical characters at every eight element.

"Similarly" say Luff and Candy" each of the first seven notes of a musical octave has a distinct character of its own, but the eighth note is essentially a duplicate of the first, and this duplication extends, note for note, throughout the next octave, and so on."

Several gaps remain unfilled, and several things remain unexplained, but nevertheless chemists believe

"that every property of an element is some function of its atomic weight, that the nature of an atom is therefore determined by its weight, that, in fact, the different atoms are not really different kinds of matter, but different proportions of some one kind of matter."

Such is the unity of Nature and such the faith of Science. Is your own faith in your God going to be less even than that of the modern chemist?

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The modern chemist goes much farther in his faith than the old alchemist, for while the latter believed base metals could be transmuted into gold, the former believes that gold and all other elements are merely transformations of a single primary substance. The modern chemist's efforts are, therefore directed to the discovery of that substance. He tries, as it were, to see that substance in all the elements, in the molecules of the elements and in the constituents of the molecules. Can you not similarly try to see the one substance you adore, in everything? A *priori*, it is difficult to conceive that Antimony and Arsenic, Cobalt and Copper, Iron and Lead, Manganese and Mercury, Nickel and Platinum, Silver and Tin, Zinc and Phosphorus are all derived from the Chemist's imaginary Protyle. But there is abundant proof that diamond, graphite and charcoal are forms of Carbon, that, in plants, sugar and starch and several other things are products of Carbon united with water, and that Carbon is the chief constituent of organic bodies. How many forms, again, does Oxygen assume? It constitutes eight-ninths by weight of water and two-ninths by weight of air, of which it is the life-sustaining principle. It is non-combustible, but a powerful supporter of combustion. It is in the dissolved air which ærates the blood of fishes, and through the oxyhœmoglobin it is conveyed by our blood to all the tissues of the body. Our temperature depends upon our burning it in a diluted form, diluted with nitrogen to adapt it to ourselves. The result of this oxidation is carbon-dioxide which we give in exchange to plants for the oxygen they give us while retaining carbon dioxide. There are acid-forming oxides and base-forming oxides and there are peroxides. Similarly Nitrogen forms four-fifths of the atmosphere by volume, is present in nitrates, and is an important constituent of the tissues and organs of all animals and plants. It is found in albumen, in all alkaloids, and in animal cartilages, casein, urea and other things. It is present, in ammonia and its salts, and through them, in all decaying matter, and through them keeps up the balance of the air. One of its oxides is an anæsthetic-laughing-gas, another is Aqua Fortis. Look anywhere, and you see the work of the elements in various forms. The sands on the beach, and sand-stone, rock crystal, quartz and flint result from Silicon, so do agate, jesper and amethyst, while Silica, an oxide of Silicon, is the chief constituent of the Earth's crust. Considering all these and other similar proved facts, the chemist believes that things tasteless and odourless and colourless, and things with taste, odour and colour, that things poisonous and non-poisonous, that things combustible and non-combustible, explosive and non-explosive, fusible and infusible, soluble, stable and unstable, crystalline and amorphous, electrically positive and negative, conductors and non-conductors, solvents and non-solvents, active and inert, have all come from a single substance. How great, then, is the chemist's faith! Truly the beauty of Truth lies

in the convergence of all its various rays towards Unity. If the chemist believes that his single Protean substance existed from eternity and was self-existent, he is really seeing God in it, howmuchsoever he may quarrel about the meaning of his terms and yours. Let not your faith be lower than his, my soul.

* * * *

Strange truly are the metamorphoses of the elements, but they themselves are not believed by chemists to be simple bodies. The Chemical Affinity that moves them is as little understood as —

"Those first-born affinities that fit
Our new existence to existing things,
And, in our dawn of being constitute
The bond of union between life and joy."

Helmboltz's hypothesis that chemical affinity results from the rush of electricity of one sign to its opposite may be true, but if true the mystery is merely deepened. What difference of level is to the flow of water, what difference of temperature is to the flow af heat, that difference of potential is to the flow of electricity. Is a similar difference necessary for the flow of soul to soul? Who has made it necessary and why? If the human mind masters electricity, did not something lie hid in the mind as a potentiality just as the 250,000 organic compounds now known lay hid, in a potential form, in the reactions of Carbon. Those reactions have given us Ethers and Anhydrides, Alcohols and Acids, Aromatic compounds and Vegetable Alkaloids, things positive and things negative. Marvel, my soul, at the wondrous power lying concealed in Hydrocarbons and Carbohydrates forms of "leasts"—ever ready to die, to change, to multiply—and do not hereafter ever despair of the power of even the humblest human soul. Chemists have made urea and several other low organic things in the laboratory, and some of them think there is nothing built up by life which cannot be eventually built up in the laboratory, and they conclude there is no separate vital force. But truly God's life, conciousness, beauty and truth lie hid in the subtlest part of every atom and sub-atom, and hence their gradual evolution. TheEarth is a heavenly body. Iron, Nickel, Manganese, Cobalt, Calcium, Palladium, Magnesium, Sodium, Silicon, Strontium, Barium, Aluminium, Zinc, Copper, Silver, Tin, Lead, Potassium, known on the Earth. were long ago detected in the Sun and Helium and Hydrogen were also in both, and some lines recently discovered show the probable presence of oxygen.

"If the whole Earth were heated to the temperature of the Sun, its spectrum would probably resemble very closely that of the Sun. The crust of the earth, which is less than 100 miles in thickness, is composed of about 80 elements. Below this crust is a stratum of molten white rock of 160 miles' thickness. Further still, where the heat is intense and the pressure enormous, we still have the rock, but now in the form of a gas. Lastly, we have the core of the earth, 6000 miles in diameter, composed of iron—iron in a gaseous form, again due to the tremendous heat and pressure."

Astronomers say that there is clear connection between the spectrum of iron and the dark lines of the solar system, and there must be iron in the Sun. The photosphere from which light is principally dispensed contains rays which are intercepted by the relatively non-luminous iron vapour in the solar atmosphere outside it and that vapour is hot enough to maintain iron in a gaseous form, though not as hot as the photosphere.

"Those rays which the iron vapour absorbs have precisely the same refrangibility as the particular rays of light which iron itself gives out when sufficiently heated."

Similarly the visible lines of hydrogen, linked as they are by an arithmetical relation, and the system of lines belonging to Hydrogen in the ultra-violet portion of the white stars are " harmonies of some fundamental note in which the molecule of Hydrogen vibrates." Hydrogen is abundant also near the Sun's photosphere. The balance maintained between the Sun's income and expenditure, and those of the Air around us, and of water, and these harmonies and the laws evidenced, indicate something far subtler than electricy in Nature's " leasts." To say, therefore, that the Sun resulted from the collision of two dark bodies in the sidereal heavens clearly ignores these " leasts," and the principle animating them, just as in all illustrations of conservation of energy and transformation of energy, the capital possessed by the Sun and other heavenly bodies and their daily consumption out of their income are generaely ignored. There is a vast co-operative Society at work outside us just as it is in our own bodies. The reduction, for example, of carbon-di-oxide under the influence of light proceeds *pari passu* with the separation of oxygen. There are chemical interchanges not only reductive and oxidative, but hydrolytic and synthetic. The free paths of Nature's " leasts " and their free energy are subjected to various constraints; and attraction and repulsion, differentiation and integration, Cycles and inverse processes give us a bewildering variety concealing the transcendental Self-denying; non-egoistic God, my Soul, and concealing your own infinity. Marriage and parentage, Co-operation and Sacrifice are working out a plan of which we see only a few fragments dimly. Do not think that these are only peculiar to humanity. They have revealed themselves in humanity because they existed potentially in Nature's " leasts," and never think for a moment that the potentiality of these " leasts " is exhausted. There are things which we cannot explain and we do fall into many error as the history of chemistry and other sciences proves. But we are allowed to commit mistakes, in order to learn self-government, and be independent if we choose, even of Him to whom we owe our progress, but who wants—no return.

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Eighty-three elements have, by this time, been isolated, and out sof them ten are non-metallic gases one non-metalic, one metalic liquid, 62 olid metals and nine solid non-metals. The elements have been likened to building stones. Compounds formed by their chemical combinations, and mixtures of compounds, with here and there mixtures of elements, or of elements and compounds,

" form the solid crust of the earth, and the waters that rest on this solid crust, and the gaseous envelope that surrounds it, and the living things that move on the earth, or fly in the air or swim in the waters."

There is no end to the compounds that can be formed.

"It has been calculated," says Pattison Muir in his book on Chemical Elements that if the whole population of the world were to devote their days and nights to dealing cards for hands at whist, they would not have exhausted one one-hundred-thousandth part of the possible deals after occupying themselves entirely at the task for one hundred million years ..To make all the possible combinations would surely exhaust time and encroach upon eternity".

In another place. after saying that the atoms are the ultimate building stones wherewith chemistry constructs all her varied buildings,

he endoreses Mendeleef's view that "changes take place in combinations of the unchanging," and he concludes his book with the remark that

"in studying chemistry it is literally true that the e is not a moment tha passe in which we do hold the infinite in our hand."

The molecular architecture alone shows the work of an Infinite power.

"Let us suppose that the structure of the molecule of a certain (carbon) compound which dyes a blue-purple is so far known that a definite structural formula has been assigned to the compound ; a certain atomic group is introduced in the place of one of the hydrogen atoms in the molecule of this compound, and the result is a compound which dyes an extremely pronounced blue ; another compound radicle is introduced in place of an atom of hydrogen in the molecule of the original compound, and the product dyes a red-purple, Now it is wished to produce a compound which will dye a rich purple, neither too blue nor too red, therefore two atomic groups are introduced into the molecule, one of which groups is known to carry with it the property of dyeing blue, and the other the property of dyeing red, the result is that the blueing tendency of one group of atoms is balanced by the reddening tendency of the other group, and a compound is produced which dyes the wished for purple shade.—Molecular symmetry is insured by opposing one group of atoms to another within the molecule."

This reminds us of what Darwin and his followers have said about the results of cross-breeding: such is the unity of Nature, and such the power of its very "leasts." See that unity therefore, in all things and despise nothing.

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Pitch blende in its crude state forms "greenish or brownish black masses" and yet Uranium was found in it and later on Radium. Similarly Brandt of Hamburg had in 1669 found Phosphorus in a residue of evaporated urine, and another chemist found it in the ashes of bones. Uranium emits light and heat, and Phosphorus, called after the morning star, is not only present in lucifer matches, but, in the form of phosphates, is necessary to plants and animals, to seeds as well as to blood, to bones as well as to nerves. Take an overdose, however, of either, and you endanger your life, and but what diseases theycause. They can also cure Do you need more proof of the presence of Mind in every atom ? Recognize that presence, my soul, and do not lose sight of it, when transitional imperfections are pointed out. It was said long ago in connection with what goes on, on this planet :

"Nature doth first beget the imperfect, then
Proceeds she to the perfect."

The so-called imperfections are imperfections only to imperfect knowledge.

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At the competition for Yashodhara's hand, he who afterwards became famous as Buddha, "was asked whether he could determine the number of primary atoms which, when placed one against the other, would form a line one mile in length". The future Buddha found the required answer in this way: "Seven primary atoms make *a very minute* grain of dust, seven of these make a *minute* grain of dust, seven of these a grain of d*ust whirled up by the wind*, and so on. Thus he

proceeded, step by step, until he finally reached the length of a mile. The multiplication of all the factors gave for the multitude of primary atoms in a mile, a number consisting of fifteen digits." Silvanus Thompson says : " An atom of hydrogen (the lightest of known elements) is from 1756 to 2844 times as massive as an electron ; and the size of the molecule of hydrogen is some 140,000 times as great as that of an electron." How many digits would be needed if we were asked to determine the number of primary sub-atoms, not in the cosmos, or in our solar system, or even in our earth but merely in the known chemical elements according to the theory of electrons ! Think of the Great Mechanician, Chemist and Artist, who out of such leasts of Nature, has made this wonderful universe of complexes and congruences !

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What an enormous amount of work is being done by these " leasts " ! Points of light, heat and electricity, points in moving fluids, points in liquids having any weight furnish us with various kinds of energy. And what a play of these embodied points is going on ! Some are moving rectilinearly, others curvilinearly. Some are sliding on inclined planes, others in circular envelopes, like tubes and the like. Some are moving in tautochrones, others in brachistochrones. Look at the planets, comets and meteor swarms. The orbits of the Points moving in them are hyperbolic, parabolic or elliptic, " according as the speed of projection is greater than, equal to or less than the speed from infinity." So says an eminent mathematician. Watch the motion of particles on this earth, and you can know a great deal about what they are doing in other heavenly bodies. Watch them as they move in various pendulums or catenaries, in rolling ellipsoids, quoits, and cylinders, and they will yield most important secrets. Attach plane mirrors to the legs of turning forks and watch the movement of a ray of light on a screen, after successive reflexions from two such mirrors, or watch it when it is reflected in succession from four mirrors, all attached, nearly at right angles, to parallel axes : the curves will be those of Blackburn's pendulum ! With a slight to and fro horizontal motion handle a sling and stone. Let the motion be nearly equal to that in which the sling and stone would vibrate as a pendulum, and you find the stone rotates completely. " This result of particle kinetics ", says a high authority, " is of great value in other branches of physics, especially sound, light, and radiant heat ! " Such is the interdependence of all Points !

"Every particle of matter in the universe," said Newton, "attracts every other with an attractiou whose direction is that of the line joining them, and whose magnitude is as the product of the masses directly and as the square of the distance inversely."

Close meditation on the falling of an apple led him to this epoch making conclusion, and it summed up the kinematical laws of the planetary motions about the sun, which Kepler had discovered, " by laborious calculation from an immense series of observations of the planets, and of Mars in particular." " As is here, so is there " said a Rishi. The chemical elements we have 'here' are 'there' also. The Points that are playing here are probably playing there also. See the power of your God, my soul, in them. Realize Him every where through them.

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In Sir Robe 5 Ball's "Story of the Sun," there is a Special chapter on 'the smallest natural objects,' in which he shows how astronomical problems, otherwise insoluble, can be solved by observing the conduct of various molecules on our earth. In other places, also he has shown how "different branches of research into the deep things of Nature become interwoven." What is the nature of musical sounds? Meditate on this subject and make your observations and experiments, and you are in a position to interpret various analogous light-phenomena. Take a glass prism, let a ray of white sunlight fall on it, and become decomposed therein into all the colours of the rainbow. Mark how differently they are acted on by the prism, on account of the difference in their refrangibilities, and how "the single beams spread out into a fan-shaped stream, the several hues representing the different rays of the fan." Meditate on this principle, and you have the Solar Spectrum! And what may the Spectrum be likened to? "To the sound generated by a device for striking every note on the piano simultaneously, but with somewhat varying intensities." A mirror can give even better aid than a prism, provided it is made into a "grating," by engraving extremely fine parallel lines on its surface, for the effect of the grating "is to produce a spectrum of such purity that its minute features can be examined more perfectly than by the older process." In order to secure a good grating, you need a good screw, besides a concave mirror. Then you can see the lines of the Spectrum and determine their wave-length, and compare them with the wave-lengths of chemical elements and ascertain which of those elements are present in the sun! If we had not produced electric currents and invented a spectroscope, and made a good screw we could not have found the wave-lengths of all the elements. If we had not learnt photography, we could not have discovered that there are waves of light to which our optic nerve cannot respond, but the quality of which is such that they operate with peculiar efficiency on photographic plates, and tell us of things otherwise invisible to us! Then, again meditation on the properties of light has brought us knowledge of the distance of the sun from us! Distant he looks, but he is nearer to us than the nearest.

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Lord Kelvin has said:

"Let us imagine a rain drop the size of a pea to be mangnified into a globe as big as the Earth. If every molecule of the water was increased in its proper proportion, then th result to which we are led is that the sizes of the several molecules would be larger than grains of shot, and smaller than cricket balls. It is also possible to form a notion of the weight of a molecule of hydrogen, and thus we find that two hundred million million million of them would weigh a milligrame; while the multitude in which the molecules are present is such that the smallest particle visible under microscope would, it has been calculated, hold from sixty to one hundred million molecules of gas.

Such is the size and the weight of a molecule. What is its physical character?. Says Sir Robert Ball:

"It seems certain that, notwithstanding its excessive minuteness, it is so far from being a mere point, or a simple centre of force, that it must be regarded as a veritable structure possessing no little complexity. Besidese that movement of translation which we have already reffered to, the molecule is also endowed with a rotation on its axis, and the several parts of which it is constituted have relative movements, which seem, so far as we can tell, to be of extreme complexity. There is good reason for believing that the lines in the

spectra of incandescent gases must be attributed to displacements occurring inside the molecule itself. From our knowledge of the wave-lengths of these lines it becomes possible to learn something of the rapidity with which these intra-molecular oscillations are effected. Here, indeed, we come to considerations which tax the intellect just as greatly in one direction, as the conception of star distances does in the other. Not withstanding the excessive minuteness of the molecule, it follows, from certain spectroscopic phenomena, that oscilation must take place within it at the stupendous rate of many billions per second."

But this is not all.

"The molecules of an elementary body in a state of vapour have certain periods in which, so to speak, they are timed to oscillate. If acted upon by undulations in harmony with any of the vibrations which the molecules themselves are competent to perform, some of the energy of these passing vibrations will be absorbed by the molecules, and they will swing with correspondingly increased vehemence. If, however, the vibrations passing the molecules do not happen to be in tune with such movements as the molecules are capable of executing, the vibrations pass on their way with undiminished energy."

That explains how

"the vapour of iron in the cooler outer atmosphere of the Sun stops and appropriates to itself the energy of those particular undulations which are in sympathy with the molecular periods of iron. How such undulations being arrested, light of those particular kinds suffers a heavy tax on its outward passage, and how in the corresponding parts of the spectrum we see black lines or lines which appear black in contrast to the vivid brilliance of the illumination on either side of them. And there is, in addition, selective absorption from our air which has the effect of adding fresh lines and characteristics to the so-called Solar spectrum."

Are not the molecules proceeding from the Sun to the Solar system like our own red blood corpuscles which have been called the little red torches that light the fire of life", which contain iron and are oxygen-carriers, and from which are selected and absorbed all that an organ or a tissue requires ? Truly but for the life-currents from the Sun the Solar System will be like a body without blood! Such is the power of molecules and now we are told that the atoms constituting them are not the last word of Physical Science, and there are electrons which are moving in them round their nucleus as planets round the Sun! O Central Luminary of all luminaries, but for Thy presence in the soul of every electron, and met-electron, can there be any evolution at all ? Thou art pouring forth without stint Life and Intelligence, Love and Beauty, and it is Thy Bounty that sustains all evolution in our world and brings about multiplicity and diversity through even the leasts of Nature. Our eyes can catch only a few octaves of vibrations. But there are indirect ways of knowing the longer undulations, in the Æther.

"How wonderful some of these may be" says Sir Robert Ball, "we can conjecture from the fact that, if our eyes were provided with nerves which would respond to such vibrations, we should be able to see through stone walls with the same facility as we can now see through glass. It sometimes seems that in the contemplation of the Sun's radiation our eyes, even with all their perfections, are just as imperfect in interpreting fully what the Sun dispenses, as would be the ears of a man who could only hear the beating of a drum when attempting to listen to an orchestral performance of a beautiful symphony. The solemn tones of the organ, the exquisite delicacy of the stringed instruments, would be alike inaudible, all that he could hear would be the tones of a solitary

instrument. Almost equally imperfect are our eyes for the interpretation of those marvellous radiations which the Sun sheds abroad with such prodigality. His beams really contain a vast key-board of vibrations of which our eyes can only disclose to us a couple of octave. Here and there within the mighty compass of the instrument we are able to devise a Photographic plate, or a Hertzian resonator, to astonish us with a few additional octaves, but of the full volume of the harmony we are almost entirely ignorant. When we think that the Sun pours forth its radiations with such prodigality that our Earth is only able to intercept the two-thousand-millionth part of the whole, when we think that other Suns in space, to the number of many millions, are each of them simultaneously filling the other with their orchestra of vibrations, when we think of the marvellous delicacy with which the medium transmits all these vibrations—we begin to realise the majesty of the words 'Let there be light'."

These facts, which furnish you with a spiritual analogy, give you a sufficient reason, my soul, for the faith that is in thee. Go on increasing it, and you also will not be denied the light you may need. Thy invisible Sun of Suns cannot be less bountiful than these visible Suns. Indeed it may be that as night sets off the day, so these visible suns set off the Invisible. He has given thee that mirroring and metaphor-producing and metamorphic faculty without which no languange is possible. Trace thy language and all that depends on language to his leasts, to the soul of the electron and the met-electron and be in tune with him.

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The molecules in gases move here in accordance with dynamical laws, and the molecules in the gases of the sun move also in accordance with those laws, for every part of the Sun is composed of molecules, every part "from surface to centre". Think of the energy due to molecular translations and of energy existing in the form of intramolecular vibrations. Think of the Sun's loss of heat by radiation, from the earliest times, the consequent diminution of the velocity of its molecules, and the manner in which such loss and diminution have been counteracted by a force constantly in action within the Sun itself, the force of Gravitation according to Ball. Watch falling bodies, watch boiling water, and meditate on what you see if you want to understand the photosphere and chromosphere of the Sun.

"Incalculable myriads of particles are dashing about in the photosphere with the enormously high velocities appropriate to the exalted character of its temperature. Whatever may be the movement by which each of these little molecules is animated, whether it may happen to be directed upward, to the right or to the left, no matter what be its collisions or encounters with other molecules, the gravitation of the solar mass will invariably tend to add a component of downward velocity amounting to 864 feet per second."

Dynamical truths—the laws of molecular physics—are in operation in the Sun as much as here, and the relative velocity of a molecule at a given temperature, here or there, "varies inversely as the square root of the mass of the gaseous molecule, though its absolute velocity increases with its temperature. Similarly, under like conditions of temperature and gravitation, an atmosphere of a gas with a low atomic weight will aseend to a greater elevation than an atmosphere of gas with a high atomic weight." Our experience of Carbon, a very refractory element, has led, on such grounds, to the probability that this element in the sun is "the main source whence sunlight is dispensed" for it can remain solid even though heated very hot, has the means of utilising its great radiating

power and has a low atomic weight (twelve) "which enables its vapours to keep constantly diffusing upwards into those higher portions of the Sun's atmosphere where the temperature is such that the vapour becomes cloud according as it arrives." Thus the photosphere, like our candles, owes its incandescence, it is said, to particles of carbon! And what is it that we do not owe to the light from the photosphere? Even the energy that works our water-wheels and wind-mills, yes the energy that gives us even cucumbers has been found to be a transformation of sunbeams! And where would be sunbeams if there were not atoms and sub-atoms? See thy God in the least of things, my soul, and not only in the greatest made up of them. You cannot measure a single degree on the meridian of the Earth, without a base line and the determination of the angles at its extremities in relation to a vertex, and without a careful measurement of a degree on Earth, you cannot very accurately ascertain the distance of the sun or fix the scale of the Solar system! Note the time which light takes to travel from your face to a mirror, through apertures in a screen moving at a certain velocity, and the time it takes to travel back again and you can measure the velocity of light by means of that constant and the constant of aberration of light, and that measurement enables you, like the gravitational method and the spectroscopic "lines of sight determinations" method to calculate approximately the distance of the Sun. The minor planets are small bodies, but they and the moon are very useful to astronomers. Even a geyser throws light on the maculæ of the Sun! We live at the bottom of an ocean of air, which refracts the light coming to us, and our eyes can see little and our ears hear little, but there is something in us which is present in the lowest as well as in the highest, and that enables us to see the invisible and hear the inaudible, and makes us at home in the corona of the Sun almost as much as in our own humble dwellings. For is He not there as well as here? Love him and feel Him everywhere, in the minute as well as in the vast, and your soul can make itself at home everywhere and adore Him everywhere. The vast is nothing but an edition de luxe of the minute.

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Let not your limitations, or the limitation of Nature in its present stage of evolutions, discourage you, my soul. He who has imposed them knows what is good for us, just as a mother knows what is good for her baby. This planet, which to an observer in the Sun appears smaller than a tennis-ball, is but a baby planet in the Cosmos, a baby even as regards its secular melioration, and wars and other tempests of the passions on this planet are like bubbles in the cosmic ocean. But even bubbles have laws, and there is no perturbation which mars the stability of the cosmos. Mathematicians, at one time, had doubts about the equilibrium and conservation of the Earth and its moon, and of the solar system. It was feared that the attraction of the sun and the moon would deform the Earth. But the Earth was found to be not only solid but elastic, and its elasticity co-operated with gravity in resisting deformation. Observation had revealed the existence of a steady acceleration of the mean motions of our moon and of Jupiter, and an equally strange diminution of the mean motion of Saturn." But the lunar accleration was eventually found to be dependent upon the secular changes in the eccentricity of the earth's orbit. And Jupiter did not fall into the Sun, and Saturn did not leave the planetary system! The cause of the so-called great inequality was found in the commensurability of the mean motions of the two planets, and was dependent upon the law of attraction. Even such great mathe-

maticians as Newton and Euler have been shown to have erred when they entertained doubts as to the effects of such perturbutions. Say therefore, with the Prophet of Arabia, "God is great" and with the Prophet of the Punjab that His Light is in all species, and all species lie in his light. His who with His ineffable art fills the Universe, and has a Universe even in point. His who can make Himself Great because He can make Himself aSmall. Have faith-have faith in Him.

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What would have been the state of this world if no Rishis, no Socrates, no Christ and no Buddha, and none of the great saints had been born. Rare souls are like Radium, but for which according to modern astronomy the Solar system of which we are a part would soon be dust and ashes. The presence of 2½ parts of radium in a million, in the sun, accounts, J according to Mr. W. Wilson, for its present rate of emission of energy. uust think of this 3·6 grammes of radium in each cubic metre of the s n's mass are sufficient to falsify Lord Kelvin's calculation that the sun has shone on this earth for 50,0000,000 years and probably for not more than 100,000,000 years. Our earth has radium to the extent of 46 parts by weight in a hundred billions, and that is sufficient "to compensate for the earth's present loss of heat by conduction from the interior to the surface, and thence by radiation into space." The present calculations as to the future of the earth and the sun may similarly be falsified by some other discovery. But even if they are not, even if sun said to have been once a white star, changes from yellow to red and finally dies, He who brought it into being can never die and He knows what is best. Turn, my soul to His Radiant ones, to His leasts, and listen to their message when interpreting Nature's leasts.

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The elements moving like all things else in the Æther which wirelessly links us to the Sun and stars, and which is present in all parts of our bodies, the elements, with the supports of the self-denying Æther, and the Sun and its children, have given us the mineral kingdom. They are present in dust, in crystals, in plants and animals. They give us poisons which contain elixirs, for all is not what it seems. Their wonders are truly infinite!

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All dust-all organic matter—is merely an embodiment of molecules How trivial look the particles of dust in water! But they become aqueou rocks with the help of cementing particles, like particles of carbonate of lime or of silica or oxide of iron. The sedimentary or stratified rocks formed by them keep a record, like our bodies, of their history, and geologists who can read their characters, draw important conclusions from such slight things on sandstones as the pittings made by rain drops, as ripple marks or worm casts or animal footprints, and the fossil remains. Similarly in igneous rocks—acid, intermediate, basic or ultra basic—streaks along the line of lava flow, vesicles in shape like almonds, sills, and dykes have a meaning to the geologist, so also the "eyes" in the folia of metamorphic rocks like slate and marble. The hypogene and the epigene agents—volcanoes, earthquakes and crustal movements as well as Heat, Light, Electricity, Magnetism, winds, rain, frost, glaciers, rivers and seas have been at work in geological and what may be called pre-geological time, and evolved the potencies of particles, and given us mechanically formed sandstone rocks, organically formed aqueous rocks like chalk and

coal, igneously formed felspar, mica and quartz in the form of granite, and all the mineral wealth we possess. There are over 800 species of minerals alone besides their varieties, and the igneous rocks specially give us the six types of primary crystals which have been very useful in connection with the discovery of polarization of light. What wanders lie hid in these crystals, my soul? The axes in the cubic system are all at right angles to each other and are equal. In the tetragonal, there are three axes, at right angles to each other but only two of them are equal. In the Hexagonal, there are three axes at angles of 60 degrees. In the orthorhombic, there are three axes at right angles to one another but they are all of different lengths. In the monoclinic, the axes are of such lengths, but one of them is at right angles to the other two which are inclined to each other. In the triclinic, the three axes are not only unequal in length, but are all inclined to one another. The faces of the crystals in all the six systems are grouped round the axes, and every crystal face on the one side of the centre of symmetry has a corresponding face parallel to it on the other side. Does all this show that no Mind is at work?

* * * *

The Sanskrit word Tapas is very suggestive. It has been found that

"the naturally coloured crystals, as well as those coloured by exposure to the radioactive rays can be made colourless by heating to a sufficiently high temperature".

The colour of the dark violet crystals found in the blue-john mine in Derbyshire is frequently

"so dark that large crystals appear almost black. When such a crystal is heated until it becomes colourless, and and is then subjected to the radium radiation, it assumes a beautiful sky-blue tint, and at the same time it becomes strongly fluorescent, the fluorescence continuing for some days after removal from the influence of the rays."

That is the paradise of a crystal, of a Tapasvi crystal which has Radium as its God. Thy God, my soul, is more radiant certainly than Radium.

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Floris Osmond in his Microscopic Analysis of Metals, speaks of Metallography as "anatomical (histologic), biological and pathological", as they have optical, chemical and mechanical characteristics, as their different constituents are connected with possible conditions of calorlific or mechanical treatment, and as they have their planes of weakness and their impurities which constitute as it were a particular diathesis. The selective power of a crystal has been compared by Hadfield to that of a bone muscle or nerve, each of which will only take to itself from the blood its own ingredients." This was written long before Sir J. C. Bose's epoch-making discoveries. That eminent scientist has proved that electrical excitation in organic or inorganic substances can be represented by responce curves, the galvanometer deflections being taken as ordinates and the times of exposure or recovery as abscissæ. A metal like a plant or animal can be drugged, and then it gives a weak response, and when it is killed it gives no response. Thanks to him, the continuity of dynamical laws throughout non-living and living matter is one of the common places of science nowadays, and that continuity is a note of Thy Unity.

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Sir J. C. Bose has shown various tests that the electrical sign of life is not confined to animals and plants but is also found in metals and

other so-called inorganic substances. He used the same apparatus and the same mode of stimulation for these substances as for plants and he found that "any conditions which increase molecular mobility—also increase intensity of response, and conversely that any conditions having the reverse effect depress response." "Different metals", he says "exhibit different periods of recovery, and this again is modified by any influence which affects the molecular condition.....The time of recovery from strain depends on the intensity of the stimulus. It takes a longer time to recover from stronger stimulus. But, other things being equal, successive recovery periods from successive stimulations of equal intensity are, generally speaking the same....I succeeded in obtaining a continuous transformation from positive to negative phase by a continuous change in the relative sensitiveness of the two contacts....The diphasic variations as exhibited by metals are in every way counterparts of similar phenomena observed in animal tissues....In some metals, as in muscle and in plant, we find instances of that progressive diminution of response which is known as fatigue...Nothing is absolutely indefatigable....It would appear—that in all the phenomena which we have studied under the heads of staircase effect, increase of response after continuous stimulation, and fatigue, there is a similarity between the observations made upon the response of muscle aud nerve on the one hand, and that of metals on the other. Even in their abnormalities we have seen an agreement....Under very much prolonged stimulation the response may decline to zero, or even undergo a reversal to negative, a phenomenon which we shall find instanced in the reversed response of retina under the long-continued stimulus of light. There is a minimum intensity of stimulus below which there is hardly any visible response. We may regard this point as the threshold of response....Though apparently ineffective, the subliminal stimuli produce some latent effect, which may be demonstrated by their additive action.... The maximum effect produced by superposition of stimuli increases with the intensity of the constituent stimuli. ..It would appear as if the reagents which act as poisons produced some kind of molecular arrest. Stimuli applied after the arrest produce no effect, as if the molecular mechanism became...clogged or locked up....The same reagent which becomes a (poison) in large quantities may act as a stimulant when applied in small doses."

All this reads like a fairy tale, but Sir J. C. Bose's conclusions have been verified and they show, as he says, that there are laws at work "that know no change, acting equally and uniformly throughout the organic and the inorganic worlds." They also show that every Poison contains an Elixir, and that things are not what they seem. There is certainly a Lawgiver, my soul, and His laws are not merely the laws Science is discovering. There are also laws of Beauty.

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Miss Grace Rhys in her introduction to Ruskin's "Ethics of the Dust," says: "The same laws that shape the small have charge over the shaping of the great; so Ruskin found that the great mountain crust follows the same laws of form that the crystal of the broken rocks. Jagged and rude as the lines of a mountain crag must be, they yet are subject to the universal law of beauty. An inner curve runs through that mountain bulk, animating those broken forms; the trained eye will detect amid the wildness of the mountains vast curves like the breaking waves of a storm; round

curves like the rising waves of a sea; leaf shapes, wind shapes, shapes that follow the lines of the plumage of a bird's wing, or the lines of a Greek crest."

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What wonderful alchemy lies concealed in Nature's leasts is also described in one of the most telling prose-poems of Ruskin, brimful of moral and spiritual lessons:

"Exclusive of animal decay," says he, "we can hardly arrive at a more absolute type of impurity, than the mud or slime of a damp, over trodden path, in the outstkirts of a manufacturing town. That slime we shall find in most cases composed of clay, (or brickdust, which is burnt clay), mixed with soot, a little sand, and water. All these elements are at helpless war with each other, and destroy reciprocally each other's nature and power: competing and fighting for place at every tread of your foot; sand squeezing out clay, and clay squeezing out water, and soot meddling everywhere, and defiling the whole. Let us suppose that this ounce of mud is left in perfect rest, and that its elements gather together, like to like, so that their atoms may get into the closest relations possible.

"Let the clay begin. Ridding itself of all foreign substance, it gradually becomes a white earth, already very beautiful, and fit, with help of congealing fire, to be made into finest porcelain, and painted on, and be kept in kings' palaces. But such artificial consistence is not its best. Leave it still quite to follow its own instinct of unity, and it becomes, not only white, but clear, not only clear, but hard, not only clear and hard, but so set that it can deal with light in a wonderful way, and gather out of it the loveliest blue rays only, refusing the rest. We call it then a sapphire.

"Such being the consummation of the clay, we give similar permission of quiet to the sand. It also becomes, first, a white earth, then proceeds to grow clear and hard, and at last arranges itself in mysterious, infinitely fine parallel lines, which have the power of reflecting, not merely the blue rays, but the blue, green, purple, and red rays, in the greatest beauty in which they can be seen through any hard material whatsoever. We call it then an opal.

"In next order the soot sets to work. It cannot make itself white at first, but, instead of being discouraged, tries harder and harder; and comes out clear at last, and the hardest thing in the world: and for the blackness that it had, obtains in exchange the power of reflecting all the rays of the sun at once, in the vividest blaze that any solid thing can shoot. We call it then a diamond.

"Last of all, the water purifies, or unites itself; contented enough if it can only reach the form of a dewdrop: but, if we insist on its proceeding to a more perfect consistence, it crystallises into the shape of a star. And for the ounce of slime which we had by political economy of competition, we have, by political economy of co-operation, a sapphire, an opal, and a diamond, set in the midst of a star of snow."

This should enable you, my soul, to realise, at least partially the absolute eternal ubiquity of God's Wisdom and Beauty and love, moving in a mysterious way, it is true, but making nevertheless all things tend heavenward. Each atom knows its place, every mineral is either fibrous, foliated or granular, and fulfils to the best of its power its adopted form, and behaves, as Ruskin shows, almost like a human being. Some have crystalline life enough to reject all impurity and preserve the integrity of their race and breeding. Some have force of heart, so to say, and steadiness of purpose, others are parasitical. Ruskin, with a master hand, describes their

varieties of temper, their faults, their efforts and their transformations. He tells us "the leaves of the rockland have their summer green, as well as their autumnal gold," and he shows how earth agonies result in marble, and what noble shelter is given by quartz and how Nature uses it for her sewing. Ruskin had spent twenty years in the study of minerals, and he expressed the result of that study in one of his most eloquent passages, which describes the initial stages of that wonderful Alchemy, that marvellous Transubstantiation which produced crystalline life, and was to bifurcate into Conductors and Insulators, into Plant Life and Animal Life, into the Eater and the Painlessly Eaten, the Sexual Enjoyer and the Sexually Enjoyed, the Ideal Lover and the Ideally Beloved.

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"You may at least earnestly believe," says he "that the presence of the spirit which culminates in your own life, shows itself in dawning wherever the dust of the earth begins to assume any orderly and lovely state. You will find it impossible to separate this idea of gradated manifestation from that of the vital power. Things are not either wholly alive, or wholly dead. They are less or more alive. Take the nearest, most easily examined instance the life of a flower. Notice what a different degree and kind of life there is in the calyx and the corolla. The calyx is nothing but the swaddling clothes of the flower, the child-blossom is bound up in it, hand and foot, guarded in it, restrained by it, till the time of birth. The shell is hardly more subordinate to the germ in the egg, than the calyx to the blossom. It bursts at last, but it never lives as the corolla does. It may fall at the moment its task is fulfilled, as in the poppy; or persist in a ligneous apathy, after the flower is dead, as in the rose; or harmonise itself so as to share in the aspect of the real flower, as in the lily; but it never shares in the corolla's bright passion of life. And the gradations which thus exist between the different members of organic creatures, exist no less between the different ranges of organism. We know no higher or more energetic life than our own; but there seems to me this great good in the idea of gradation of life it admits the idea of a life above us, in other creatures, as much nobler than ours, as ours is nobler than that of dust."

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A Newton is yet to arise who is to find the law explaining the incarnation of electrons into atoms, of atoms (with their linkings and fixings) into molecules, of molecules into in organic matter, and trace to that law the forms of crystals and the colours of minerals, and prove that "living bodies are nothing but extremely complex bundles of forces held in a mass of matter as the complex forces of a magnet are held in the steel by its coercive force." But before that day comes there will be a new meaning attached to matter and force, a new meaning to atoms and sub-atoms, a new meaning to body and soul! The degenerate alchemists made room for the phlegistoneans, and these made room for the modern chemists. Similarly the next race of chemists will be different from the modern. The balance they will use will be quite a different one for they will have to weigh the invisibles and other and more subtle than material atoms. Even now we realize that all that is best is invisible. Life is invisible. Sir John Herschell says that light is truly invisible, and we know mind is invisible. It will be the invisibles that will give us a universal law operating both in the inorganic and the organic, operating both here and there, both above and below. And when that day comes the Old Seers will stand vindicated, for He the One will be found within and without.

Light invisible! Science, the deeper it goes, the more clearly does it make our darkness visible. But how is light itself invisible? What is the number of light waves which must enter the eye in a single second in order to produce the sensation 'red'? A number of fifteen digits, namely, 459,613,440,000,000 !!! What is the number before we can see 'blue'? A number one and a half times as great as the above !!! "About 39,000 waves of red light, placed end to end, would measure an inch in length, while the waves constituting the violet colour are still smaller, 58,000 of these being required to occupy the same length. The wave lengths of the colours intermediate between the red and violet vary between these extremes." Are all these waves visible to us? "A ray of light is a world in miniature." Is that world visible to us? The properties of light, and especially of polarized light open out to us, it has been said "a world of wonders, a universe sui generis within the compass of the smallest visible atom and for each atom of a different material a different one—all, however, related and bound together in one vast harmony." Smallest visible atom! But chemical atoms are invisible. Their linking power and their fixing power is invisible? The motions of molecules in every visible mass, which appears to us at rest are invisible. Chemical Affinity is invisible. Gravitation is invisible. The waves of heat, light, electricity and magnetism are invisible. The power which transforms one kind of energy into another is invisible. The continuous Æther in which the discontinuous live and move and have their being is invisible. Why, even the sound waves in the air are invisible. What makes sound analogous to light, and gives it reflection and refraction is invisible. Light is "exactly similar in character to a chord of seven notes," and "just as the notes of the chord are produced by impulses differing in wave length", so are the seven colours which compose white light. "In the case of a complete *opposition of phase* two equal musical sounds may produce silence, and two equal rays of light *complete and continued darkness*." There are rays which produce all the effects of photography, and even a photophone has been constructed, "which transmit sounds to a distance by means of a beam of light reflected to a distant spot from a thin mirror thrown into vibrations by the voice, the beam falling consequently, with varying intensity upon a receiver of selenium connected in circuit with a small battery and a Bell telephone receiver in which the sounds are reproduced by the variations of the current." Vibrations transverse, vibrations longitudinal, waves upon waves! All these are invisible, my soul. To train yourself to see God in all things, see first the invisible in the visible, the Continuous in the Discontinuous the Infinite in the finite, and admire the art of the Divine Artist.

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How did our central luminary with his invisible light come into being? How did the stellar universe come into being? Alpha particles of Radium, it is said, carry positive charges, while Beta particles carry negative ones. The impact of two stars liberates such charges by the disintegration of radioactive substances, and the charged electric particles ionise the light gases, nebulium (not yet found on earth), helium and hydrogen, composing the outer layers of the matter ejected on account of the impact. The electric nuclei, when they form ions will serve as centres for condensation.

The cosmic dust will build up meteorites, by the aggregation of small particles, and swarms of them falling towards the central mass of the

ejected matter "will tend to compensate the heat lost by radiation." The central mass will become a sun, and our sun and our solar system, are said to be of very recent origin compared with the countless ages during which the transformations from nebulæ into suns and their planetary system, and from suns and their systems into nebulæ have been taking place. "Radioactive substances are formed, according to Arrhenius, most probably during the earlier stages after the birth of a sun when the pressure and the temperature are high, and these substance liberate their energy and keep up the heat when the sun is cooling. "Had it not been for them, there is every reason to suppose that the sun might have ceased to shine, and been transformed into a dark star." As it is, our sun, according to recent astronomy may live a billion years yet, and then sub-atoms will build up radioactive substances again when there is an impact, and there will be a new sun. Thus even great luminaries live and die, my soul, it may be after millions of years, and what has been said by the Yogis about the Prakritilaya appears to be justified by recent science, which treats Laplace's theory as a mere first approximation, not accounting fully for various facts since observed. How æther and with its electrons first came into being, science does not know, but no eminent scientist, any longer doubts that a Primal Intelligence is at work. Science my soul, therefore attempts in its own way to give you a vision of that intelligence. As Max Muller has finely said in his "Last Essays", "the whole of our knowledge of nature be comes a recognition of the logoi of nature by the Logo s of ourselves."

The mechanical physicist had his logoi, and the molecular had his, but the progress of knowledge has shown that other logoi are necessary. "The direct contemplation of the All simply overwhelms us with its vastness. We have found that the only road to success lies in the construction of successive working models, of gradually increasing complexity, as larger portions of the All are brought within their purview, but the complete correlation of even the simplest series can only be dimly perceived by the eye of scientific faith, as the outlines of a cloud-shrouded peak to which we are ever approaching, though its summit may ever remain above our reach." Even the summit may be gained by His grace.

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The invisible light of the sun shines on, and the inorganic world is undergoing changes now as it has undergone them in the past. All polished metallic surfaces completely absorb that part of light which they refract, but all the metals in nature are not polished, and the degree of absorption, therefore varies. The part of the incident ray which is not refracted is the part that is reflected. Metals as well as non-metals have a definite chemical composition, upon which their geometric form appears to depend, and many of their important properties depend upon their form. Analysis may reduce a thing to its minute constituents, but analysis should never forget the synthetising power of the Sun and of the children of the Sun. Again, it is not enough to say that "there is as much heat or motion or calorific energy...in a tea-kettle as in a Gier-eagle" when it swoops down on a hare or a partridge, and the form does not matter, the force is everything. To the artist "the primary cognisable facts in the two things," says Ruskin, "are that the kettle has a spout, and the eagle a beak, the one a lid on its back, the other a pair of wings; not to speak of the distinction also of volition....The kettle chooses to sit still on the bob; the eagle to recline on the air. It is the fact of the choice, not the equal degree of temperature in the fulfilment of it" which to artists is the

more intersting circumstance. "The transformation of force into light is a great piece of systematised discovery...but hold fast to the form, and defend that first, as distinguished from the mere transition of forces. Discern the moulding hand of the potter commanding the clay, from his merely beating foot, as it turns the wheel." Science sees one side only. Art sees another: do thou try, my soul, to see both and commune with Him Whom neither Science nor Art can see withtout profound spiritual meditation.

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The Sun shines on, and there is wonderful photosynthesis going on. Says Macgregor Skene :— "Not only does it result in a supply of food, it results also in supply of energy; and so all the energy of the plant is derived from the sun. But we must remember that in the last instance all our food as the food of all animals-is derived from plants. If you eat mutton, the sheep ate grass. If we live on fish, we live on marine plant. And our bodily heat and our energy come from our food. Further almost all the energy which is important in civilisation is obtained in the last instance by burning coal or oil—coal the remains of long-dead plants, oil the debris of ancient fishes. Animal life and human life depend on the fact that plants are green, and our civilisation, built up on the exploitation of energy supplied us by fires, rests on that foundation too. The Sun in the last resort is the source of all life. Photosynthesis by green plants is the keystone in the arch of nature."

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Plants and fires! What a combination! No meat but for plants! No fish but for plants! No oil but for plants! No coal but for plants! And no plants without photosynthesis, and no photosypthesis without the Sun. True, but how did the first plant synthetise the light of the Sun? There were elements in it which attracted the light. But whence came the elements? From the Sun. One and the same power, in various forms, has been at work, and has been bringing forth complex things which disguise its operations. Stem and roots and flowers are from it. The leaves upon which photosynthesis depends are from it. The stomata of the leaves into which carbon-di-oxide passes from the air are from it. That carbon circulates in the spaces between the cell and finally dissolves in water and enters the cells. Inside it comes in contact with the green pigment (chlorophyll), and in presenee of light and of moisture it becomes decomposed. This process results in the liberation of oxygen and in the formation of carbon compounds." Sugars and starch are thus formed, and they are the true foods of the plants. The minerals (containing sodium, potassium, calcium, chlorine, silicon and iron) pass from the soil, with water into the root, and through the wood of the root and the stem, they with the water are carried to the leaves, where water meets with carbon dioxide and the manufacture of the foods takes place, and the sunlight is locked up in them.

"The food substances may be used in two different ways. They may be built into the structure of the plant. So sugar is converted into cellulose and forms new cell walls, and so it is combined with nitrogen and other ash elements and formed into the complex proteids of which the living matter of the organism is composed. But in the second place the food substances are a source of energy....The plant requires a supply of energy: it requires energy to increase in height, to force its roots into

the soil, to raise water, and to carry on innumerable chemical reactions bound up with its life. It finds the energy locked up in its food-stuffs, and liberates it by the process of respiration."

The skin on both sides of a leaf is built up by cells which contain no chlorophyll. The stomata are in the skin. Strip off this epiderm and you find, in flowering broad leaved plants, branching and interlacing the veins which traverse the core of the leaves-the fleshy green part, while in flowering plants with leaves like grass (the lily etc) the veins are not branching but run more or less parallel from one end to the other and are joined together by cross pieces. The cell-sap and the cell wall in the leaves are called non-living by science. The wall is of cellulose, a carbon compound, and it is lined inside with a sheath of protoplasm which science calls the actual living part of the cell, for in it "take place all the processes actually concerned with the life of the plant." It is a slimy fluid substance with a little knot of denser material, the nucleus, the business of which is to regulate the activities of the cell, and it also frequently contains little masses of colouring matter" (bright green chloraphyll). The actual absorption of the light of the sun takes place in the chlorophyll. The power residing in the cells in every plant takes care that the leaves do not shade one another so as to prevent their exposure to light. The forms of the leaves are infinite, but water and air and and light converge in all, and the carbon compounds are manufactured in all, the compounds which enable them to maintain both their vegetative and reproductive functions.

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Chlorophyll, says Science, belongs to the class of quinones, but it is not quite a quinone, for a quinone cannot cause reduction. H. E. Armstrong, in his article on Organic Chemistry in the Encyclopædia Brittanica, thinks it probable that chloroyhyll (literally leaf-green) "undergoes reduction at the expense of some easily oxidisable substance, and that the reduction of carbon-di-oxide is effected. wholly or in part by the quinol (a hydro-quinone) of chlorophyll—one at least of these changes taking place under the influence of light." The reduction proceeds, he thinks, pari passu with the separation of oxygen, after the quinol comes into operation. The majority of coloured carbon compounds are referred to the quinone type, and colour is supposed "to originate in the co-operation" of certain ethenoid groups with the unsaturated benzenoid nucleus, quinone being a benzene derivative, and each of the ethenoid groups being an "independent light-absorbing centre."

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"Quinone and its homologues, and indeed the simple quinones generally, are at most either yellow, or orange, or orange-red in colour....The introduction of oxygen (as OH) or halogens usually has the effect of deepening the colour—a result, it may be supposed of the introduction of a further slight co-operative effect. Colours other than yellows and reds-blue shades of red, greens and blues are met with only in mixed quinonoids" that is, compounds in which the two ethenoid groups are dissimilar, one at least being a more or less complex group. How did the first vegetable organism, (according to Botany, a sea-weed), manage to form the green pigment, on which the whole world of organic life depends, but regarding which science

can only venture to give a mere statistical formula, not a structural one yet. Sir J. C. Bose gives good reasons for holding that in every plant there is a diffused heart. All that Botany says regarding the eating, drinking, marrying, breeding, clubing ways of plants would go to show that they have not only a diffused heart but a diffused brain also. Did not the Upanishadic Rishi say: "Annamayo hi somya mana"—and if mind had not been involved in plants it would not have been evolved. Even Darwin has said: "The root of a plant is as intelligent as the brain of an animal."

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The sun shines on and we have once, marvellous mineral vegetable and animal kingdoms. The flora and fauna are intimately connected with the character of the soil and the climate. The elements give us the soil, a couple of them chemically combined give us water, to the mixture of two of them principally we owe the air, we breathe, and, according to all accounts, without the Sun, neither plants nor animals can live. The Sun is, as it were, the father of our world. He is the Archæus who is moulding "the offspring into the likeness of the parent," according to the first great law of reproduction, but he takes time. "Science" says Huxley, "will some day show us how this law is a necessary consequence of the more general laws which govern matter. We know that the phenomena of vitality are not something apart from other physical phenomena, but one with them, and matter and force are the two names of the one artist who fashions the living as the lifeless." That great Artist is a self-denying Artist, and so he allows the living and the lifeless—the apparently lifeless—to take all the credit for all the beauty and utility evolved by His "leasts." He mereover allows them millions of years to make their mark. Thus, according to science, it took the earth millions of years to cool; and millions of years elapsed before flowering trees and fruit trees appeared. They had their humble beginning in such tiny things as the Algæ; the fungi, and Bacteria.

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Look at a horse-trough, a pool of rain-water or any clear tank, and you see something greenish appearing in a day or two. What is this greenish matter? It consists of minute algæ, each of which is pearl-shaped and is provided with a bell-shaped chloroplast and with a nucleus regulating efficiently a certain volume of the cell substance and effecting cell-division when that point is reached at which further increase is impossible. The little mass of protoplasm has around it a delicate membrane, one end of which, more pointed than the other, has two cilia or lashes, by means of which the organism whips itself through the water. The cell-sap lies in two pulsating vacuoles. This simple cell, which Botany calls a chlamydomonas swims about and manufactures its food and finally divides into two exactly equal halves. Each half is equipped with an equal part of the cell organs, and proceeds to form a new wall and new cilia, and when these are ready, escapes from the wall of the mother cell as a new entity. If no walls are formed, the pairs conjugate and fuse and settle down as a tiny spherical mass "and rest for some time, and then germinate, producing several new chlamydomonas individuals." There are also cells, like them, which remain more or less loosely attached and form plate-like or spherical cell-colonies, or filaments may be produced, with branches and numerous nuclei. In briskly running streams threads of cells are joined end to end, each cell containing a band-shaped chloroplast and a nucleus, and each cell

may produce a motile spore with four cilia, or gametes possessing only two cilia. In either way swarms of spores may be produced. On the sea-shore we see flat leaf like green fronds, linked as filaments. Their cells divide lengthwise as well as across. They have pigments which perform the work of chlorophyll. They are red in warm seas and brown in cold seas. There is no differentiation into root, stem and leaf, but the colouring matter in them enables them "in the presence of sunlight, to make use of the carbonic acid gas of the atmosphere as a source of carbon." The red and the brown, the green and the blue-green Algæ, have each their absorption bands. "The penetrating power of light into a clear sea varies for light of different colours. Thus red light is reduced to such an extent as to be insufficient for growth at a depth of 34 metres, yellow light at a depth of 177 metres, and green light at 322 metres."

Oxygen is liberated in the process of carbon-assimilation, and the Algæ, like Bacteria, are motile in the presence of oxygen. They absorb nitrogen best when it is presented to them in the form of a nitrate, an amide or a peptone. They have "a constructive mechanism by which they are enabled to fabricate the food on which they live from the inorganic, gaseous liquid matters which they absorb." It is their rudimentary chlorophyll apparatus, and connects the Sun, with perhaps the simplest of all plants. How these Algæ which inhabit the sea almost entirely came first into being, Science does not know, but its microscope tells us of all the wonders exhibited in these microscopic organisms. Bell-shapes, pearl-shapes, band shapes, cell-sap, cell-wall, cilia, organs, digestion, assimilation, excretion, reproduction, variation, motility, symbiosis: have they all come from matter which had neither latent life in it nor latent mind in it? The Physiology of Plant Life admits that plants show a purposeful response and organic rhythm. Did these arise from something purposeless and unrhythmical? Did the whole wealth of the Vegetable kingdom, on which we depend for fats and oils, sugars, starch and cellulose, aromatic substances and proteids, and most of our healing drugs originate in something blind?

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Macgregor Skene says the Algæ have followed one line, and the Fungi—which have no chlorophyll —another, and both these low types "show us the general trend of evolution not its exact course". The toad-stools, mildews and rusts are all Fungi. The most familiar of the fungi are those that feed on the remains of dead organisms and are called saprophytes. Damp organic matter "from bread to old boots" is found nutritive by the saprophyte called "blue mould" which multiplies by spores. It sends forth into the air "filaments branched near the apex like a candelabrum", and its spores are oval or spherical tips of each branch. These are cut off and measure about 1/3000 inch in diameter. Unlike the swarm spores of the Algæ, "they have a firm cell-wall and they possess no cilia". The firm cell-wall gives them protection from the air in which they are produced, and by the currents of which they are passively distributed. Decaying organic remains are found nutritive by the saprophytes called mushrooms and toad stools. The sporing body which is formed underground has a stalk with an expanded cap "on the underside of which are radiating gills" bearing the spores....Cultivated plants like the rose may be attacked by mildews and cereals by rusts. The fungi can use up sugar, wood and paraffin. Their products are vinegar and alcohol. "The yeas plant is a fungus which converts sugar into carbon-dioxide and alcohol"

There are fungi also in water and Science believes that the various classes of fungi, saprophytes and parasites, have developed from various types of Algæ which have first become partially and, through loss of their chlorophyll, have finally become totally, dependent on external food supplies".

Mycology, or the Science of the Fungi, has occupied the attention o numerous workers and thinkers. The total number of their species is at least 20,000, but the census is not complete. They can live together with Algæ in what is called Symbiosis. They have made themselves independent of light by giving up chlorophyll, but they respire oxygen, "require water, small but indispensable quantities of salts of potassium, magnesium, sulphur and phosphorus, and supplies of carbonaceous and nitrogenous materials in different stages of complexity in the different cases". The parasites are fastidious in the choice of their hosts or of organs for attack. This fact, says H. M. Ward, and the fact that they may be restricted during a long incubation period and rampant and destructive later, "point to reactions on the part of the host plant, as well as capacities on that of the parasite, which may be partly explained in the light of what we now know regarding enzymes and chemotropism." "Certain substances in definite concentrations cause the tips of hyphæ to turn towards them, other substances, though not innutritious, repel them, as also do nutritious bodies if too highly concentrated". The hyphæ are also attracted by certain chemicals and not by others. Wounds and feeble tissues give occassions to facultative parasites for entry. Plants and animals, like human kind, have to be kept on the alert, if they are to develop, and the Fungi, like Bacteria serve this purpose. Like Bacteria also, they have their peculiar economic products. In infinitesimal doses again several of them, for example, Agaricus, Bovista, Secale Cornutum or Ergot, Ustilago, Boletus, Phallus Impudicus, Polyporous Pinicola, and Russula have healing qualities. Ergot has been found indispensable by gynæcologists in *civilised* land as it acts as an ecbotic. Agaricin, which contains the active principle of the white agaricus stops sweating "by acting on the peripheral nerves of the sweat glands". That is its allopathic use. In Homœopathy it is a for more useful medicine. How such qualities came to reside in Fungi no one has yet explained. Of the Algæ, Fucus Vesiculosus or Sea-kelp is considered by Homœopathy a powerful remedy for goitre and is compared with Thyroidine, Badiaga and Iodum. It contains a large proportion of Iodine. That important drug is obtained from its ashes. If the Algæ had given us nothing but Iodine, and Fungi nothing but Ergot, the Medical Profession at least would have said they had justified their existence. There are gradations in both just as there are in crystals. There are parasites in both just as there are in crystal. There are virtues and vices in both just as there are in crystals. Would we have had such a word as Virtue if there had been no Vice. Moreover all is not what it seems and every poison has an Elixir in it.

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Bacteria were, at one time,little understood. H. W. Conn who knows so much about them, tells us these plants are minute and extraordinarily simple, that they are everywhere in Nature, that their numbers and their powers of multiplication and their ability to produce profound chemical changes are vast beyond conception. "Upon them the farmer is dependent for the fertility of his soil and the possibility of continued life in his crops. Upon them the dairyman is dependent for his flavours. Upon them important fermentative industries are dependent, and their

universal powers come into action upon a commercial scale in many a place where we have little thought of them in past years. We must look upon them as agents ever at work, by means of which the surface of Nature is enabled to remain fresh and green. Their power is fundamental, and their activities are necessary for the continuance of life....Without them plant and animal life would be impossible on the face of the earth". In whom do some of them develop poisons and produce disease ? R. T. Hewlett in his standard work on Bacteriology bears testimony to their selective action. That explains that analytic faculty of theirs which is known as putrefaction. They grow and multiply to keep the face of Nature fresh and green by doing away with all that is rotten. Hewlett quotes his authorities for the proposition "that the toxins of bacteria are really cleavage products derived from their cellular proteins under the influence of ferments present in the host", and their pathogenicity "depends on the quantity and consequent activity of the ferments of the host". It is, therefore, quite practicable to convert what are called pathogenic germs into non-pathogenic ! Twart, for example "has succeeded in training B. typhosus to ferment lactose". The B. typhosus also may, "by symbiosis with B. coli be converted into B. alcaligenes, and Revis has found many variations occur with coliform organisms as a result of cultivating in malachite green media, etc". Have nothing, therefore, putrescible in the body, in the soil, water or air, be perfectly clean and live a clean life, and the bacteria will let you alone. If there were no bacteria, the dead remains of animal and vegetable life would accumulate, and the earth "would become barren for the want of the organic matter originally derived from it, but of which there was no return" And if the earth became barren, where would be life ? The bacteria, descended probably from Algæ (sea-weeds) are our friends, not our enemies. They are also great teachers, for they are turning the attention of the medical profession as well as of statesmen to Prevention and Hygiene.

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Think, again, of the food cycle. "Beginning with the mineral ingredients in the soil, the food matter may start on its circulation from the soil to the plant, from the plant to the animal, from the animal to the bacterium, and from the bacterium through a series of other bacteria back again to the soil in the condition in which it started. If perchance in this progress around the circle some of the nitrogen is thrown off at a tangent, this, too, is brought back again to the circle through the agency of bacterial life. And so the food material of animals and plants continues in this never ceasing circulation. It is the sunlight that forces the food around the circle and keeps up the endless change." It is this repeated and continued circulation "that has made life possible for the millions and millions of years of the earth's history," and makes it possible still. How much then depends upon these much-maligned tiny creatures.

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The Cycle of Food, which Science speaks of, reminds one of that Upanishadic cycle described by a Kshattriya king, Pravahana Jaivali, to a Brahmin Rishi, Gautama, which relates to "small creatures." Hewlett tells us that the bacteria reproduce themselves by a process of simple division, and although the parent disappears yet there has been no death, no dissolution, as its protoplasm lives in its two daughter forms and this process of reproduction may go on indefinitely. The multiplication is so rapid that "fifty or sixty generation may develop in thirty hours, a number

which would take years to attain if even the most rapid breeder among mammals were the subject of experiment. Hewlett for these reasons tells us the bacteria are truly immortal and Weismann was right in calling them so. The Upanishad says they are "continually revolving," and continual revolution is also a kind of immortality.

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The Protozoa have also been misjudged. They play an important part in the economy of Nature. Should the simplest of them sense a bacterium, "it moves towards it, flows round it" and engulfs it. Even the simplest have "contractility, irritability, secretion, assimilation and reproduction" as their functions, though they consist "of a tiny globule of jelly, about 1/100th of an inch in diameter, in which the microscope reveals fine granules, transparent spots or vacuoles, and a complicated kernel or nucleus."

The differentiation of their contractility, says Zoology, has given us our Muscular system, that of their irritability, the Nervous System, that of their Secretion, the glandular System (salivary glands, sweat glands, gastric, juice, pancreas, liver, sebaceous glands, sweat glands, lacteal glands) and hair, nails, cartilage and bone, that of Assimilation the blood stream and lymph vessels and the Excretory System, that of Reproduction our Reproductive System! "The sex-cells from which each individual springs are not," says James Ritchie "the creation of individual parents, but are handed down in unbroken line through succeeding generations." This continuity of the germ-plasm is only one illustration of the law of Continuity. Certain unit characters may remain latent or recessive, but the old doctrine of the Vasanas derives great support from all that Science has discovered regarding Heredity: only that ancient doctrine is thorough going, and does not confine itself to organic life, as it sees latent life even in inorganic matter.

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Jonathan Hutchinson, in his article on the Laws of Inheritance in Disease (Volume I of Allbutts System of Medicine) says: "I will take permission to avow my belief that with the sperm and germ supplied by parents there may pass to the offspring tendencies to the reproduction of everything that these parents had acquired upto the date of the sexual congress." By "acquired," he means "all that has been received by modification of vital processes, not what has been imposed or taken away by external violence." Parasitic elements or specific poisons are transmissible. Epidemiologists recognise family susceptibility to typhoid, scarlatina and diphtheria (Allbutt V—173). Asthma, hay fever and paroxysmal sneezing, other neurotic diseases, chlorosis and even a delicate bronchial membrane have been found transmissible. Syphilis and tuberculosis and similar constitutional symptoms are well-known to be hereditary in the form of "tendencies." "As long as a person remains in health" says John Hopkins (Ibid VI) "his powers of adjustment are prompt in action, from inherited instinct and required habit." When those powers fail, disease encroaches by irritation, destruction or degeneration, and the products of all inflammations are contagious (Ibid II). "All unwholesome conditions, all circumstances which lower the vitality of the individual, operate for evil" says Dr. Ernest Hart. The pathogenic bacteria or protozoa attack such individuals with success, not those whose powers of resistance are intact. It is unjust therefore to fall foul of these organisms. They have their gradations and do not care

to flagellate our own vices and neglect of duty: we want an escape-goat and we have these ready to hand. Those who went in for impure sexual intercourse, and converted the non-pathogenic germs in their bodies into pathogenic and handed down their evil *vasanas* their vicious tendencies with the pathogenic germs, to their offspring, blamed Nature and themselves, though teachers had arisen among them to warn them against evil-doing and stiff-neckedness. The "leasts" of Nature that can act as punishers also act as rewarders. We inherit not only what is bad, but also what is good, and it is in our power, speaking relatively, to bring about modifications suppressing the former, and increasing and intensifying the latter. There is struggle for food and sunlight even among forest trees, but says Rodway "the balance of life is evenly kept" "No one species dominates over another, but each seems to have developed some particular quality which gives it an advantage, and enables it to exist notwithstanding the efforts of its rivals. It holds its own, but cannot get ahead, for the others are also on the alert....This has been going on for ages, with the result that aggressive and protective developments are continually taking place, and making every generation stronger and fitter to take its part in the battle. Man has gone through a similar training," and in him also the "leasts" of Nature will find a way to keep the balance of life even. That is also the teaching of Biology.

A tiny nitrogenous substance with a small nucleus in the centre is the beginning of plant life as well as animal life, according to Huxley's Essays on the Condition of Organic Nature. And in his Essay on Darwin's Origin of Species, he says: "The student of nature wonders the more and is astonished the less, the more conversant he becomes with her operations; but of all the perennial miracles she offers to his inspection, perhaps the most worthy of admiration is the development of a plant or of an animal from its embryo."

What beautifully formed bodies finally emerge, though in their earliest condition "the primordial germs of a man, a dog, a bird, a fish, a beetle, a snail and a polype are in no essential structural respects distinguishable." Science has been compelled to use astronomical terms and speak of mother-stars and daughter-stars and pellucid zones, and equators, in describing the work carried on in the embryo. Huxley in his Essay on the Study of Zoology put himself the question "How does all this take place"? To him even the tail of a lobster was a "most beautifully constructed organ of locomotion," and he saw that the constituents of plants or of animal bodies were in correlation with inorganic substances, were not mere unconnected parts, and were working together to an end. Unity of organisation was clear to him, and Science admits it. Could such unity come from Duality.

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Matter and Force, children of the Sun, have, according to Science, produced all the Dicotyledons, Monocotyledons and Acotyledons out of the most insignificant "green mites flowing free in water", out of "mere specks of green jelly". Science guesses that these mites and specks—the ancestors of the whole Plant World—and the other tiny bits of protoplasm—the ancestors of all the one-celled animals (the Protozoa), the two-layered ones (like the Sponges, the three-layered ones (like the flat Worms), and the three-layered ones with a body-cavity (like the higher Worms and the Vertebrates including Fish, Amphibia, Reptiles, Birds and Mammals) sprang some how from combinations of natural atoms under the influence

of Sunlight—combinations as able to give fires as fir-trees, as able to give fur as flax or cotton. Science shows how complex structure was preceded by simple structure, the flower, for example by the weed, the spinal column by the notchcord. It shows why man is called a worm, and actually classes him with the higher worms. It shows how man in his embryonic life has even gill-clefts, and how his ears and Eustachian tubes take the place of the clefts. It shows how all the Vertebrates have alternate ingrowths (or infoldings) and outgrowths of skin, resulting in scales, feather or fur. It tells us the skeleton of the earliest Vertebrates was made up of fibrous and cartilaginous tissue, not of bones, and for this reason considers the shark more primitive than the salmon. It traces advance in structure of both plants and animals under the influence of their environment and the Central Luminary, in millions of years, for Nature takes her own time. It takes note of the fact that leaves, fronds and spores shed by ancient forests formed the beds of peat which, compressed from above by overlying strata and heated hot with burning fires within the Earth, have been turned into coal-beds. It takes note of the beauty of the world of flowers springing from Four Floral Whorls, the Calyx, the Corolla, the Stamens and the Pistil. It takes note of the early killers of the mammoth and the rein-deer, of man as a fire-maker, a maker of tools out of flint, wood, bone and horn and later out of iron, of man as a builder, of man as a spinner and weaver. The promptings of his instinct to provide himself with food and shelter made him a discoverer and inventor, and his imagination and curiosity worked in the same direction. His attempts to see things as they are, to compare his actual observations with his imaginings, and his perseverance in spite of his failures were the sources of his success. "The impression of a naked foot upon yielding clay" or the hardening of earth on a fireplace gave humanity perhaps its first potter. The imitation of thunder or of the roar of the billows, or of "the sighing of leaves, the song of birds, the gentle monotone of bees" gave it its first musician. He who first observed the change of water into ice, of rain to hail and snow, of firewood or coal to smoke, flame and ashes proceded him who saw sulphur blacken and solidify limpid mercury and was the fore-runner of our chemists. He who rubbed some beans and held them over wisps of wild cotton and was amused to find the wisps attracted to the beans, and he who rubbed sealing-wax on his coat and held it over straw and found the straw clung to the wax, and he who experimented, later, with amber and silk or flannel were the fore-runners of our electricians. He who first roughly measured a field on the banks of the Nile to prevent confusion of the "bounds and meres of lands" by floods, was the fore-runner of our surveyors and geometricians. He who first distinguished the pole-star and discovered its use and he who first noticed the shadow of the earth during an eclipse of the moon were the fore-runners of our astronomers. He who noticed sun-pictures in the retina of the eye, in water and in glass, and he who found that horn-silver assumed a dark colour, when exposed to sunlight, were the forerunners of those who give us the magic pencillings of the camera obscura. He who first hit upon a system of elders for every "hundred" was the forerunner of the founders of States and the organisers of armies. He who built the first canoe was the fore-runner of Cabot, Columbus and Da Gama, but for whose voyages there have been no British Empire. None of these things, says Science, could have taken place if there had been no Sun ! Could there have been a Sun, if there had been no god ?

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What was the feeling, idea or thought-rune, which called the

human spoken word into life? Archbishop Trench found fossil-history, fossil poetry and fossil ethics in simple words! What was it again that gave every nation its alphabet? The mimetic instinct shared by man with the lower animals. That made him a sign-maker "on fragments of bone, born schist and other material" and his pictographs were "the parent of the alphabet." The roots of such words as "book" and "library" take us back to the time when tablets of the bark of the beech tree or the inner rind of other trees were used as paper, and the words "paper" and "bible" take us back to the time when paper itself was manufactured from the pith of the papyrus reed just as " style" "pen" and "quill" take us back to the time when boards and feathers were of use as writing materials. "Om" is a mere syllable, but out of it, as written, it is said, all the alphabets can be constructed, and Max Muller in his "Lectures on Language" calculates that out of 24 letters alone, 20, 448, 401, 733, 239, 489, 360,000 words can be constructed. None of these things could also have taken place if there had been no Sun and no God!

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The word "digit" tells us of the time when fingers were used as counters. The Babylonian figure for ten was two hands held palm to palm as in prayer. Historians of mathematics have been much exercised as to who invented zero. The word is understood to be a doublet of cipher which is derived from the Arabic Sifr (Sifra-empty). The Latins, says Cajori, called zero, Zephirum, and according to him, "the grandest achievement of the Hindoos and the one, which of all mathematical inventions, has contributed most to the general progress of intelligence, is the invention of the principle of position in writing numbers," dependent on the sign Zero. "Generally," he continues, "we speak of our notation as the "Arabic" notation, but it should be called the "Hindoo" notation, for the Arabs borrowed it from the Hindoos." He is quite certain on the point. "The nine figures for writing the units are supposed to have been introduced earliest, and the sign of zero and the principle of position to be of later origin." This ideal symbolism he says was not possessed by even the keen-minded Greeks or any other nation. Perhaps it was given to the Hindus to invent it, as in ancient times they understood the "leasts." Did not one of their Rishis say. *Sa ya esho anim aitad atmyam idam sarvan*?

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There is photosynthesis going on even in the human body, my soul. Let it guide you to the spiritual photosynthesis practised by the Rishis. Every one has experience of the marvels of the human muscular and nervous systems. To help you in your meditation, remember how histologists explain the surface tennon of muscles by differences in potentials. They tell you that there are electrolytes in muscles, and potassium is one of them. Schafer's Histology is full of the marvels of metamorphosis in the human body which are matched only in the history of cosmical development, for ontogeny and cosmogeny seem to run on parallel lines.

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Your eyes and ears can give you volumes for cogitation. How wonderfully work together the various parts of the eye, the cornea, the anterior chamber with its lymph, the iris (with a hole in it the pupil and with the ciliary body at its back to keep up the secretion of lymph through the posterior chamber), the capsule of the lens, the vitreous, the retina (with its rods and cones), the choroid, the sclerotic (with its epithelium, its substance proper and its endothelium), the conjunctvia,

the eyelids and the eyelashes, and the nerves, arteries, veins and the capillaries. How intimately interdependent they all are, and how closely connected with the rest of the body. The blood pressure in the body governs the pressure within the eye. The pupil dilates if there is anæmia. There are reflexes not only to light, but to the emotions, so says Parsons in his work on Eye diseases. Let a man or a womon be stricken with grief, and the sight suffers. That old story of Jacob becoming blind owing to his losing Joseph is not untrue, though it is as little understood how psychic impulses are transformed into nervous ones in the cortex, and vice versa, as how the Sun forms crystals and protoplasm and how protoplasm becomes sarcoplasm and neurones and blood and bones and all the numerous other things anatomy and physiology tell us of. Hindu thought would say that as the language of the senses is understood by Manas, and the language of Manas by Buddhi, and the language of Buddhi by the Jiva Atma, so the language of the Jiva Atma is understood by the Prithak Atma within us who is the same as the Param Atma. We do not know how the end organs of our physical sight speak to the cortex, but we have no doubt they do. So we do not know how the Karmic self speaks to the Akarmic, but there can be no doubt it does speak, and what Tennyson wrote is very true:

"Speak to him for He hears, and Spirit with Spirit can meet."

The Yogis and the Seers know the vehicle and the mechanism of that kind of speech and meeting, and His Lovers know. Probably the end organs of the senses—or rather all the peripheral nerves have a sort of Morse Code for speaking to the central organ called Manas. If that Code consists of vibrations, we can understand how the vibrations, caused by the Name when uttered with intense Love to the Presence "Closer than breathing and nearer than hands and feet" may be the means of putting the soul in communication with the Divine Spirit. This secret is said to do the secret of the Shabd and the Surt. It is blissful, my soul to make love te the Supreme. O for a spiritual oculist to cure the ametropia and astigmatism from which wo suffer! How I wish a spiritual painter would teach me that internal limning which filled the Rishis when seeing His glory in the morning sun shining on the Ganges, and reciting the divine Gayatri that internal limning which is the joy of saints in all lands.

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Wonderful, Oh Lord, are the piano keyboards you have placed in the internal parts of my ears. Wonderful is the way the outer ear, the middle and the inner co-operate. Even the form of a snail is necessary to you to form the human ear. Did you go through mathematical calculations before designing the ear for the reception of vibrations? How much depends on the rapidity of these and on their amplitude and on the revolution! Why the whole of human music! But is that the only music we can hear? Is not every one of our senses symbolic in a sense? My ear is confined to eleven octaves of sound notes, and my eye to a single octave of Æther vibration, which constitutes visible light and produces, in a second, a wave 186,000 miles long. Sir J. C. Bose in a lecture he delivered to a Bombay audience on January 24th, 1918 said that the electric waves produced by Hertz were ten million times longer than those which constitute a beam of light. He himself has been able to produce waves of the shortest length, and turning on a beam of his invisible light to the Bombay University calender at a particular angle

made it transparent, and showed how blind we were to what was passing around us in the ocean of Æther. Why the Sankhya placed the ear above the eye is justified by what he said about the greater limitations of the human eye than of the human ear. Pressing the button of a particular apparatus, he could create æther vibrations one hundred million times a second? The ætherial ocean, he said, in which we are all immersed, is agitated by multitudinous waves, but we remain unaffected as we possess no organs of perception to respond to them all. When æther notes are at a particular pitch, a red glimmer of light may make its appearance to us, when at another we may feel a sensation of warmth, or see the few colours we actually perceive. But as the frequency of vibration rises, our organs of perception fail us completely, a great gap in our consciousness obliterates the rest. The brief flash of light is succeeded by unbroken darkness." That is truly our case spiritually also unless we have attained to the necessary angle of vision, and our souls are not opaque to God's presence in the æther and all things in which Æther resides and which reside in æther. And there is certainly something higher than æther as Myers shows in his "Personality its survival after death." The metætherial organ, with its infinite stops—each stop giving rise to a particular note—must be making far more beautiful music than ear has ever heard, and to the higher beings everything must be as transparent as the Bombay University Calender became to Sir Jagdish's audience in the Royal Opera theatre. The Yoga Sutras had perhaps something similar or superior in view when they spoke of the Yogic power of seeing the invisible and hearing the inaudible. Our eyes and ears and our voice-box (with its thyroid, cricoid and arytænoid cartilages, its epiglottis, its two vocal chords, its muscles and nerves, arteries and veins,—packed in small areas), are wonderful enough, but there are certainly things more wonderful still. And whence all there wonders and many more?

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There are two hundred millions of spermotozoa present in a single act of coitus, and one of them is quite sufficient to fertilise the ovum: so says Halliburton in his Physiology. Sperm and germ uniting produce a cell which produces the ectoderm, the mesoderm and the endoderm, from which all our tissues and organs (including blood and lymph, eyes, ears and our voice-box) and our reminismscenes of our past are derived. The fairest of women on earth and the bravest of men are but a disguise of two and three, the two gametes and the three derms, and Two and Three throughout Nature, are to seers, but a duplication and a triplication of the One all-present everywhere. Science now calls that One Æther.

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The mineral, vegetable and animal kingdoms, and the world of humanity are connected, at both ends, with the Unseen World and with one another. The great scientist Mach has said that if you deal with the mutual action of any two forms of matter, you find "the neglecting of the rest of the world is impossible." Speak of direction and velocity in space and you refer to the entire universe, to Æther. You cannot explain gravitational or optical or electrical or magnetic or radiation phenomena without the Æther. So say our latest authorities on Science. Is not all this a materialistic confirmation of Mystics? What an intimate interdependence in the universe is proved by Science! And there can be no interdependence without a unifying co-ordinating influence call it what you will.

Penetrating all bodies of matter freely, and yet resisting none, present in all, and yet producing no effect on our sensory organs, quiescent and yet not stagnant, a vast field of electric and magnetic lines of force, comparable to a bundle of stretched springs as far as any comparison is possible, and yet unaffected in its essence by light, heat, electricity or magnetism, unpolarised and yet the source of polarisation, integral and yet the source of differentials, continuous and yet the source of discontinuity, homogeneous and yet the source of heterogeneity, a manufacturer, without hands or machinery, of strain forms, capable of free motion, out of stresses, comparable to stresses occurring in solid bodies, and the basis of all matter through these electrons : such is the present scientific conception of Æther. And yet there was a time when scientists used to laugh at the paradoxical language of Mystics. Why the Mystics stand now justified by Science itself, for Science can do without its paradoxical Æther as little as the Mystic without his paradoxical God!

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What is Thy message to us, through the new Scientific revelation of the constitution of matter, new in demonstrability, but old in itself? "The atoms of matter," it is said, "consist of aggregates of electrons which are themselves simply strain forms in the ether. Material atoms are, therefore, simply differentiations of portions of the original formless ether arising from certain distributions of motion... or .. certain energy configurations." At present the only kind of electron known in the isolated state is the negative electron. Such negatively electrified particles act as "carriers of the electric current in the phenomena of vacuum-tube discharge" and are emitted from many of those substances which are known as radioactive. They are "nothing else than charges of negative electricity, quite free from ordinary matter." There is, however, experimental evidence as to the existence of positive electrons, according to Sir J. J. Thomson. They are at the centre, and the nucleus of an electron, "is assumed to be a very minute region, but not so small as to be practically indistinguishable from a mathematical point, and it is also assumed that there is no ineritia or energy foreign to the ether residing in its nucleus such as would prevent free unresisted mobility, so that nothing is involved in the electron except a strain form." The sub-atom of every atom consists of electrons "as far apart.....in proportion to their size, as the planets in the solar system are in proportion to their size." Again, "the cycles of changes in material atoms, as observed in the case of the more unstable forms, such as the constituents of the substances specially designated as radioactive, correspond so closely with those observed in star systems that no absurdity or impossibility would be involved in a speculation which regarded the whole starry system of our visible universe as forming nothing more than an infinitesimal portion of the substance of some greater universe. It might even form but a single molecule in some particular body of such a universe." This thought of G. W. De Tunzelmann's Treatise on Electrical Theory and the Problem of the Universe, reminds one of Yoga Vasishtha and its Brahmands. The Brahmands may not be alike. "The matter composing such a universe would be far more complex," says Tunzelmann "than any form of matter known to us, but its physical properties might quite possibly bear at least a general resemblance to those of the matter with which we are acquainted." It may be that the difference between the body of an angel and the body of a man is merely a difference of degree, a difference like that of the protoplasm of algæ and the protoplasm of President Wilson or Lloyd George.

"Arrange a series of electrons to form an atom and arrange a series of atoms in ascending order of the number of electrons in them, and you may have the chemical elements, according to their atomic masses. The valency problem has also been shown to be soluble by means of the electron theory." With the exception of gravitation and cohesion, the whole complex of material phenomena appears...to be capable of representation in terms of actions transmitted through the ether...Cohesion...can be fully accounted for in terms of gravitational attraction, acting at very small distances... Gravitational forces are extremely minute in comparison with electrical forces." And a theory has been propounded to explain gravitation by means of electrons which are sinks beside electrons which are sources, and the existence of a four dimensional region out of which and into which the ether flows without constraint. "Through the nuclei of the electrons, those apertures being supposed equal for all positive electrons, and also for all negative electrons...The nucleus of an electron, spherical when at rest in the ether, becomes deformed when moving with velocity through the ether into an oblate spheroid of eccentricity while... still retaining the property of acting at all external points as if its charge were concentrated at the centre. A change in the ether circulation through the electron would appear to be a necessary consequence of such deformation, and would lead to a variation of gravitational action with the speed." The message brought then to us is that of unity.

No one has ever sensed the Æther. How then did Hindu philosophy form such a correct concept of it, when using it as an illustration of the great truth that we live and move and have our being in God? How were Democritus and Lucretius able to picture Æther almost as it is now pictured by Science? Science has placed every religious soul under a deep obligation by justifying the old Sanskrit spiritual terminology based on the concept of Akasa, Ghat-Akasa, Chid-Akasa, etc. Science believes in a continuous plenum which is the basis of all matter and electricity. The material atoms of the chemist are but differentiated portions of Æther. The celestial wonders of Astronomy are more complex differentiations. The suns as well as the sub-atoms of every material atom—("atoms of electricity") called electrons move in the Æther. The space intervening between the the suns or between sub-atoms or atoms is Æther. The strains and motions determined by the electronic nuclei and the reflections and refraction of light from the suns are transmitted by the Æther. Æther penetrates to the inmost core of a sun as much as to that of an atom. And yet Æther in a solid, in a liquid, in a gas or in what has been called by Crookes "the fourth state of matter," is different as a transmitting medium of light from that free Æther, the transverse vibrations of which constitute light. There is nothing in the world of sense or the world of the spectroscope and telescope to which we can liken Æther. It is a perfect fluid, according to the mathematical conception of such a fluid and yet it acts also like an elastic solid. Magnify the electrons in an atom and you have the solar system Magnify the soul, and you have the Over-soul. It has been said that mental pictures based on material analogies of the total energy of strain in the Æther and of the stress, or, in any valid sense, as constituting explanations of them." But such analogies are helpful to non-mathematicians and non-metaphysicians and non-yogis, and have thus a use. Even subtle physical things, like electrons, cannot be properly represented by analogies derived from gross matter, for example by the analogy of minute steel network drawn through mercury. To a mathema-

tician, the four-dimensional region is as good as a reality. To a metaphysician, the Absolute is a reality. To the Yogi, the inhibition of all waves of the mind by deep concentration, a negative state hardly intelligible to others, brings positive knowledge and positive powers. There is a "stage of self consciousness," says Tunzelmann, "in which subject and object are both actually realised as essentially one, not only with each other, but with the Eternal Self-consciousness constituting the ultimate reality known under the designation of Brahm. When this is once realised, the Absolute is recognised as being the essential reality, in comparison with which the lower reality of the phenomenal world is but an illusion. The realisation necessarily involves the recognition of his own true self, freed in mental vision from its phenomenal environment, as identified with and included within the higher self-conscious unity, or ultimate reality, of which the universe of nature is but the phenomenal manifestation.....The theory of the universe, as indicated in the Vedas and Upanishads, is developed by purely a priori reasoning from his conception of the Absolute. The Eternal Self-consciousness, in the perfect freedom of its self-determination, first manifested itself in the form of mind. From this first manifestation as mind there was evolved a second manifestation in the form of force. Force in its turn gave rise to ether in which vortices, or "whirl pools," as the Vedas express it, were formed, giving rise to a series of ethers of increasing density and complexity. Matter as we know it was supposed to be derived, by further increase in complexity, from the final term of the series of ethers.....Although the Vedic scheme of the universe does not, and could not be expected to, bear detailed comparison with that of modern physical science, the similarity of their broad outlines is extremely remarkable, even at first sight. It becomes still more so when we take note of the fact that the very indefinite Vedic concept designated by the term force corresponds far more with the modern concept of energy than with that of force, and when the term energy is substituted for force, the Vedic scheme of development becomes identical with the one which expresses the most recent developments of physical research."

This generous view ignores one fact, the fact, namely, that in meeting adversaries, even Shankaracharya had to fall back not on mere philosophical theory or a priori reasoning, but actual experience of Yogis, in support of the revelation of the Upanishads. The Sanskrit philosophical terminology is more precise than the Western, and mind is hardly an exact rendering, either of Purush or Mahat Buddhi or Ahamkar, while Shakti may properly be translated "Energy." What a contrast, however, is presented by a physicist like Tunzelmann, deeply acquainted with Max Muller and Hindu philosophy writing in 1910, and a metaphysician like Hegel, who, in the twenties of the last century, not having the necessary materials, represented the Hindus, in his Philosophy of History as well as in his Phenomenology, as mere dreamers or fantastic idealists. Similarly we, also O Supreme, not having the necessary information, misjudge you and your works. The Hindu sages and seers meditating on nature as they saw it and on their own selves found Thee. The Greek sages and seers, likewise found Thee by such meditation. The German philosophers, with probably Hindu souls in German bodies, found Thee in their own way, by such meditation, likewise, and by meditation even on human history, and now

science, analysing and synthetising, has found Thee. The delight of discovery would be nil if it were easy to find Thee. But even the lowest in rank, even Mahars and similar classes have produced their saints, for to the eye of earnest faith and to the humble and pure in heart Thou art always accessible.

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Our minds are but embryonic, and if nevertheless we have produced what Mathematical and philosophical and scientific truths we now possess who can foresee to what hights we may attain ? M. Brieux has said :— "The noble minds of India, without having had the necessity of having recourse to experimental science like us, discovered the truths which we discover after them. By the unaided power of meditation, they have given an explanation of the universe which appeared ridiculous to us for a long time, but which our scholars are now beginning to accept." And referring to the heights attained by Hindu sages, Max Mullar says, "None of our philosophers, not exepting Heraclitus, Plato, Kant, or Hegel, has ventured to erect such a spire, never frightened by storms or lightnings. Stone follows on stone, in regular succession after once the first step has been made, after once it has been clearly seen that in the beginning there can have been but One, as there will be but One, in the end, whether we call it Atman or Brahman." All this power of vision came from Thee and the vision of Science comes also from Thee. Well has Sister Devamata said : "Truth is revealed in the world of the metaphysical, it is made practical and universal in the world of the physical. Man perceives Truth by cultivating his metaphysical or spiritual sight, he shares it with his fellowmen by developing his physical resources. The subjective is always individual, the objective alone can become social. But the letter without the spirit killeth, so a well-constructed social and political organism without a true religious consciousness is a body without a soul. The stirriug of religious interest throughout the West today shows that it is beginning to recognise this fact. And now as always will it be the provinee of the East, while learning lessons of material progress from the West, to point to the occidental world the way to a renewal of subjective or spiritual life." All Thy children are equal in Thy sight, and Thou art a generous Giver. Who would have dreamt a century ago, when Hegel despised Hindu thought, of which he knew very little, that it would be placed above his, and who would have dreamt that a negative verb, "wireless," would come into use in these days and all it implies would lead to an etheric scheme of the universe, opening men's minds to the reality of the Unseen world and the power of its "leasts" and leading to speculations reconciling the highest philosophy with Science. There were only a few Yogis in olden times. Science bids fair to increase their number.

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Materialistic science says that ether is the substance of the universe, Hegel says in his Philosophy of History that "Reason is the *substance* of the Universe, *viz.*, that by which and in which all reality has its being and subsistance." Materialistic science says that ether is the Energy of the Universe....Hegel says Reason is. "The Infinite Energy of the Universe....It is the infinite complex of things, their entire Essence

and Truth. It is its own material which it commits to its own Active Energy to work up, not needing, as finite action does, the conditions of external material of given means from which it may obtain its support, and the objects of its activity. It supplies its own nourishment, and is the object of its own operations. While it is exclusively its own basis of existence, and absolute final aim, it is also the energising power realizing this aim, developing it not only in the phenomena of the Natural, but also of the Spiritual Universe—the History of the world. That this "Idea" or "Reason" is the True, the Eternal, the absolutely powerful essence, that it reveals itself in the World, and that in that World nothing else is revealed but this and its honour and glory—is the thesis which... has been proved in Philosophy. And, according to the closing paragraph of Hegel's work "the History of the World, with all the changing scenes which its annals present, is this process of development and realization of Spirit—*this* is the true Theodicæa, the justification of God in History. Only *this* insight can reconcile Spirit with the History of the World—*viz.*, that what has happened, and is happening every day, is not only not "without God," but is essentially His Work." But we must always remember, that our Earth is a minute part of our solar system, that our solar system is a minute part of the visible universe, and the visible universe is a minute part of the Unseen Universe. Do we not know how small is the world of our senses, and how big the world of our senses, and how big the world of the telescope and the spectroscope and the mathematician's world. The World of the Spirit is much bigger, my soul.

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Science has made synthetic dyes out of chemicals, but they are not as good as natural dyes, and physicians, who have written about the care of infants and children, have raised their voice against the use of synthetically dyed socks, frocks and the like in the nursery. Science has, also, made synthetic drugs similarly, but they differ from the drugs the plants give us. It is not sufficient to try drugs on guinea-pigs or rabbits, cats or dogs or even monkeys. There is a subtle difference in human blood, and the best books, therefore, on Pathogeny are the Homœopathic, for they are systematic and scientific records of what healthy human subjects experienced on taking drugs, in various doses, under medical observation, or supervision. Hering, after whom a Homœopathic College is called in America, found a difference in the effects of *calcarea carbonica* and *calcarea ostrearum*, and always made use of the latter, not of the former. Hahnemann, his master, had discovered a difference between the effects *carbo vegetabilis* and *carbo animalis*, and later Homœopaths have found the effects of chemical *carbon* to be different from either. Besides dyes and drugs, Science has also synthetically made certain waste products of the human body. But there is an essential difference between such waste products which are to go back to Inorganic Matter, and the other products which have to sustain Organic Life. Moreover until the effects of such synthetic waste products are scientifically and systematically tested, we can never be sure that there is no difference between the two. Science admits, it cannot create even a pinch of dust or salt, far less a particle of radium or an electron or a sunbeam, a vegetable cell, or an animal cell or a zygote. All that it can, at present, do is to *change the form*, constructively or destructively of some kinds of existing inorganic and

organic matter. The best surgeons and physicians are those who do their best to exclude foreign matter, and leave it to the trophic and reparative elements in the body to do the rest. Science has, moreover, to isolate its subject-matter, in order to specialise, and every specialist is proved to ignore the close connection existing in all parts of Nature, and in all branches of knowledge. Thus, Science, successful, on the whole in the mere analysis of visible inorganic matter, has been less successful in the analysis of organic matter, and still less successful in explaining the synthetic processes of life, while its actual creative work is nil. But even if Science were able to create electrons and cells, and hit upon a Sanjivini bringing the dead to life, we would probably be in no better position than the Daityas who had Shukracharya as their Guru, and were eventually humbled by Brihaspati. Nay more, even if we could create a solar system, we would find that something infinite still remained to be achieved. The Yogis of India found (as is clear from the Yoga Sutras) that Siddhis or miraculous powers were pitfalls on the spiritual path, and that Para-Vairagya (Supreme Renunciation) was higher than even the possession of omnipotence and omniscience in the World of Relativity. These had no attraction for the highest Yogis, or the Upanishadic Seers, or for Kabir or Nanak and the other great Teachers of India who bore testimony to the value of Non-Egoism, and knew there was a sphere higher than that of the nine doors of the body—the sphere of the tenth door, the sphere, if so it can be called, which pervaded all the worlds and was yet independent, the sphere was continuous and yet discrete. All the deepest teaching in our world relates to Non-Egoism, and Jesus had that in view when he spoke of losing in order to find, of dying in order to live. Analysis and Synthesis, therefore, should pave the way for Love and Self-Surrender—for going out of one's self, for complete Non-Egosim, and not for the achievements of the Titans or Atlanteans, or the achievements of the disciples of the one-eyed Shukracharya or even those of Trishanku's Guru, before his Paravairagya was accomplished.

CHAPTER III.
LOVE AND SELF SURRENDER.

Æther, strain forms, charges of energy, electrons, and atoms of elements! These are the earliest stages known to Science. Conn gives us an illustration which we can extend to electrons. He says if the inhabitants of the moon looking through their telescopes were to see man moving on the earth and doing all sorts of work, they would naturally take him to be the all in all on our planet. Similarly when the Cell was discovered, it was taken to be the source of all life. It may be that years hence the Electron will take the place of Cell, when all the gaps between it and the Cell are filled, and, it may be that a later age, will find the Met-electron, which the Sankhya called Shabd (Rhythm), and something higher which the Sankhya called Ahamkara (Consciousness), and something still higher which it called Buddhi (Intelligence) in the microcosm and Mahat in the macrocosm, and something still higher, Prakriti (the ever-becoming) with the three Gunas, and something still higher the Mula Prakriti with the Gunas in perfect equilibrium, and something without which Prakriti is lifeless and blind, the Spirit. At present Science speaks of Atom plus Atom in the Elements, of molecules and molecular compounds, of such compounds

in solution (Colloids), of simple organic compounds, of formless proteins, of complex proteins, and of obscure changes in the protein compounds resulting in life. On the other hand Bergson appears unwittingly to espouse the cause of the Sankhya, when he says: "Life is consciousness launched into matter"; while Tunzelmann accepts the Hegelian philosophy and Vedanta.

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The Visible is from the Invisible, even according to Science. May it not be that the telescope, the spectroscope and the microscope are, after all, but poor instruments, and that continual flux and change characterise only the worlds they reveal. May it not be that the cycles of astronomy, physics, geology, of inorganic matter, plant life and animal life, expressions not merely of flux and change but of law and order, are mere glimpses of, so to say, one side of the Shield. What a revelation may not be awaiting those, who meditating on the world beyond the world of Relativity, may, with His grace, see face to face as it were, the Source of all law and order! The final word of Analytical Sankhya, of Experimental Yoga, of Synthetic Vedanta is one and the same. The Spirit, each speaks of is the Self conscious, Luminous, Blissful, Self Sacrificing Spirit—who is the life of all forms of Intelligence, Consciousness and Rhythm, of all forms of energy—potential, Kinetic and Radiant, of all forms of work—of its seed, of its Flower—of its Fruit, and yet who transcends every one of these nine forms. Can you imagine bliss of meeting the Transcendent One, my soul. "Not indeed for the husband's sake, the husband is dear, but for the sake of the atma—the Self—is dear the husband." And the same words have been used in the Brihadaranyka concerning wife and son, property, Brahmin and Kshatrya, worlds aud gods, the Vedas and the Elements, and the Universe. To the meditative soul, duly qualified by holy work," all become mere Atma." Where there is duality, says the Upanishad, there, as it were, another sees, smells, hears, speaks, minds and knows another thing. But the meditative soul that has realised the difference between the Formless, the Immortal, the Infinite, the Ineffable and what has form, is mortal, finite and definable, can gather the Upanishadic Honey from Water, Fire, Air, Aditya, Quarters, the Moon, Lightning, Thunder, Æther, Justice, Truth, Mankind and the Soul, and can gradually qualify himself for visualising "the essence of what has no form, immortal, infinite and beyond", and for the world, if it can be called a world, which is superior to our world of Relativity. In that world nothing that is the food of death here can be of any use, neither our sense of smell nor our sensation of smell, neither speech nor word, neither tongue nor taste, neither eye nor colour, neither ear nor sound, neither mind nor desire, neither hands nor action, neither skin nor touch. There are no fetters or their auxiliaries there, neither days nor nights, neither the lunar bright half of the month nor the dark half, neither Uttarayana, nor Dakshinayana.

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In the World of Relativity, Fire, Fuel, Smoke, Flame, Embers, Sparks and Ashes form a cycle. It was deeply meditated on by the old Agnihotris. Pravahana Jaivali asked : "Dost thou know how, in the fifth libation (áhúti), water comes to be called man?" And he explained his meaning by his symbolic Five Fires. There was a Fire which had the Sun

as its Fuel, the rays as its Smoke, the day as its Flame, the moon as its embers and the stars as its Sparks. There was a second Fire which had the Air as its Fuel, the cloud as its Smoke, the lightning as its Flame, the thunder as its Embers and the thunderings as its Sparks. There was a third Fire which had the year as its Fuel, the sky as its Smoke, the night as its Flame, the cardinal points as its Embers and the intermediate points as its Sparks. There was a Fourth Fire which had Speech as its Fuel, breath as its Smoke, the tongue as its Flame, the eye as its Embers and the ear as its Sparks. This Fourth Fire was Man, the third was Earth, the second the Atmosphere (Parjanya, the giver of rain), the first was the heavenly region lighted up by the Sun. What were the libations poured into these Fires? In the first, Shraddha or Faith, in the second Soma, in the third rain, in the fourth food. The fifth Fire was woman, and the fifth libation was the food-born sperm. Thus the water of Faith, in the fifth libation, became man. And the man that meditated on Faith and Tapa (Self-control) went to Light, from Light to Day, from Day to the bright half of the lunar month, from that half to the Uttarayana ; the six months during which the sun rises northwards, from the Utarayana to the Samwatsara (the Year), from the Samwatsara to the Aditya (sun), from the Aditya to the Chandramasa (the moon), from the Chandramasa to Vidyut (lightening) and thence a purush (spirit) not human, took him to Brahm. But the man who did not so meditate had to become Ashes, though his wonted fires burst forth again to return to the world below. He passed on to Smoke, thence to Night, thence te the Dark half of the month, thence to the Dakshinayana, thence to the Pitriloka, thence to Akasha, thence to the Chandramasa (king Soma, the food of the gods). Consuming the fruit of his actions in his previous life, he descended by the same path to Akasha, thence to Air, thence to Smoke, thence to Mists, thence to Clouds, thence to rain-drops, thence to the world of plants supplying food to man thence to man and from man to woman. "Those whose conduct here has been good will quickly attain some good birth...And those whose conduct has been bad, will quickly attain some evil birth." Hindu thinkers and Buddhist thinkers have been at one in looking upon the cycle of birth and death, upon the world of Relativity, as undesirable, at least, as not the highest. But even in this world we see His wonders and we see Him as Sacrifice in the mineral world and in the plant world, in the animal World and the human world. Even, according to Science, something there certainly is which is going through battlings in crystalline life, in plant life, in animal life and in human life, and developing, in each life, powers of resistance to the laws of mere matter and Motion overcoming those laws and transcending them. The progressive development of such powers means the progressive development of spontaneity, of freedom, until it ends in Moksha, in Nirvana. Pravahana Jaivali was disgusted with the twofold cycle he described, the cycle of tiny creatures like bacteria and the cycle of Karmakandis, the men of works. He was in love with Him who is higher than the World of Relativity, and He who gives such love must be making room somewhere for those who feel it. There are others who cannot appreciate freedom, without first undergoing bondage, and we have had, instances of nations who did not appreciate freedom even after undergoing bondage, and looked back to their days of bondage

as happy ones. Once more, then have faith my soul and be one of His least and love Him. He who can be within and without can also give us that spontaneity which alone can justify our accountability, and can give us power to rise above Relativity. What staggers Science is our punishment for ignorance of law when the ignorance is apparently unavoidable, but in first place, what is considered punishment may be no punishment at all. That is the beautiful lesson taught hy the story of the good king of the genii in the Arabian Nights. And in the second place, why should we assume ignorance? There have been teachers in every age, and unlike modern teachers and lawgivers they aimed at Prevention. Moreover, if He is in all, how can He be ignorant? And he who understands Relativity and Non-Relativity has a great deal to say on that point. Putting aside, however, that explanation, and bearing in mind merely the fact that there are numerous worlds, how can we be sure that we are not a convict colony for another world, or that the denizens of that world do not migrate willingly to ours? There is intense intercommunion in the Cosmos, because of His ineffable love and self-reciprocation which flow through all things, and with which things act on one another. "There is," says Hegel, "no Self in our sense of the word in God, none except the consciousness of perfect Being: and we can best express what that consciousness of Being is by saying that it is for ever the unspeakable delight of everlasting thought unremittingly passing into creative activity, in which that which we call self is so lost as never to be known." It is His unutterable peace which subsists even at the heart of apparently endless agitation in Nature and the things of sense, agitation bringing about strange stirrings and kindlings resulting in differences for the purpose of union-agitation leading to wonderous weddings and wonderous offspring—agitation veiling Him the Indivisible self-divided—the Invisible assuming a thousand forms and names—the Personal Being "ever melting on the skirts of consciousness into the Impersonal." The Impersonal Being indistinguishable from the Personal.

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That there are other worlds admits of little doubt. Our Sun is only "a private in the host of heaven." The lustre of Arcturus is one hundred times greater than that of our Sun. The two components of Mizar, it is said, have a mass not less than forty times that of our Sun. Beta Cygni consists of a pair of Suns, one of the colour of topaz, the other of an emerald, and the Galaxy contains a host of Suns. Sir Robert Ball has good reasons for holding that "the millions of stars which we actually see are simply the conspicuous members of a vastly more numerous host, of whose existence we are almost entirely ignorant, save for such glimpses of knowledge as the theory of probabilities can afford." "If we were able," he says, "to wing our way from this Earth into the depths of space, and if in the course of our journey we looked back from time to time on the system we had quitted, we should presently find that the Earth became more and more insignificant, until at last it was quite invisible, the small planets first, and the larger planets afterwards, would drop entirely out of view. If the voyage continued for hundreds and thousands of millions of miles, the Sun would begin to be shorn of those supereminent splendours which at present distinguish it so conspicuously from all other objects in the sky. When at last the traveller had gone far enough to obtain a convenient

view of the neighbouring stars, the Sun would no longer appear to occupy an exceptional position, it would have sunk to the insignificance of a small star, not nearly so bright as many of those which adorn the heavens every night. In fact, the cardinal truth of modern astronomy is that which teaches us the modest position of the Sun in the celestial scheme; we learn that our orb is, after all, no more than a star, and not by any means an exceptionally bright star." And our little Earth, to an observer stationed on Procyon would seem about the same size as a penny-piece would look to one who viewed it from a distance of eight miles." There is water in many of the heavenly bodies, and even supposing that there are no other forms of life except those to which water is indispensable, there must be life, as we know it, in those bodies. Truly the whole of our Solar system, itself but a speck in the Milky Way, is like a single note in a grand Symphony. Never forget, my soul, the author of that Symphony. Never forget you are in a Cosmos, and that it is the self-expression through His very "leasts," of the Greatest Architect, Sculptor, Painter, Poet and Musician. Give him thy love without Stint.

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The diapason has certainly not closed in man in this three-dimensional space. The celebrated Gauss used to speak of the metaphysics of mathematics, and mathematicians, since over half a century, have been familiar with Hyperspace or what is called dimensional space. Euclid's parallel-axiom was really not axiomatic : that was an error but like other errors it contained a seed within itself of its own rectification, when meditated upon, and the meditation led to the discovery of three other geometries, besides the Euclidean! The geometry discovered finally, called the projective geometry, was such that the spherical, Euclidean and pseude-spherical geometries could be deduced from it! Then the kinematics and mechanics of n-dimensional space were investigated, and Cajori, in his History of Mathematics, sums up the results achieved as follows: "It has been pointed out that if a fourth dimension existed, certain motions could take place which we hold to be impossible. Thus Newcomb showed the possibility of turning a closed material shell inside out by simple flexure without either stretching or tearing. Klein pointed out that knots could not be tied; Veronese showed that a body could be removed from a closed room without breaking the walls; C. S. Pierce proved that a body in four-fold space either rotates about two axes at once, or cannot rotate without losing one of its dimensions." Men may laugh at metaphysical speculations, but mathematics is a different matter. And the mathematical faculty has been evolved, not certainly out of nothing. Did not Sir John Herschell say about the relations of atoms that they involved all the "ologies" and all the "Ometries," that a differential equation which, algebrically written out, would belt the earth, was integrated by them in an eye-twinkle, that all the numerical calculations were worked out by them in a way to frighten Zerah Colburn, George Bidder or Jedidah Buxton, and that it was the presence of Mind in them, that solved the whole difficulty? Do thou, my soul, realise that Presence.

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Reduce all the starry heavens, including our Earth, to a Point, and then try to imagine the potentiality of that Point the Bindu of the sacred

philosophy of the oldest Seers—the Bindu which contained both Pind and Brahmand—both the microcosm and the macrocosm—the infinitesimals and the infinites, the maxima and the minima, constants and variants, negatives and positives, subjects and objects, souls and bodies. That Bindu held within itself this universe of numerous roots and stems, branches and leaves, flowers and fruits—this universe of millions of matrices, of million of functions, of millions of lights and their images, millions of harmonies and their echoes—this universe self-balancing, self-developing, self-repairing, self-revealing. Think of Him Who, in every "least" has placed a centre of force both quantitative and qualitative, both transforming and trophic, a centre of force dowered with Truth and Beauty and goodness and so dowered because of the presence in it of the Infinite—a centre of force capable of evolving consciousness and intelligence love, and freedom. Remember in all pessimistic moods that the greatest self-developing, self-balancing and self-repairing power cannot be exhibited in the absence of liability to disturbance and derangement. Remember also that there are cycles, the existence of which led Carnot to his brilliant discovery—the basis of thermodynamics. Remember that the cycles are reversible, and "the general principle of 'reversibility' holds in all conservative system." "If, at any instant, the velocity-vector of a particle, moving under the action of a conservative system of forces, be reserved, the particle will simply retrace its previous path." Similarly, we have enzymes the great characteristic of whose action is that it is reversible. "Yeast will break down sugar into alcohol and Co2, but will also synthetise it out of alcohol and Co2" Indeed it has been said recently that "all life energies in cells are compounded of what may be called a building-up factor and a breaking-down factor, a reaction and a preparation for reaction," and hence the primary and secondary effects, the positive and negative phases of drugs. "The most prominent action of a drug is apt to mask its opposite effect, but the latter is nearly always to be found if looked for." Voccine-therapy shows that the micro-organisms which are the causes of so many serious diseases when our powers of resistance are lowered can also be utilised for healing purposes, and the whole science and art of Homœopathy is based on the healing power residing in drugs which, in substantial doses are dangerous, but which, in minute doses, bringing out their essence, the essence of their "leasts", are health-restoring. Do not, therefore, be appalled, my soul by Error or Evil. The remedy of each lies within itself. Did not Aryabhatta, the Newton of India, say long ago: "Multiplication becomes Division, Division becomes Multiplication; what was gain becomes loss, what loss gain."

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Electrically any locus of points can be inverted into another locus of points, and inverse processes are common in other sciences. We have even an Invert Sugar, and as said above, there is a ferment (invertin) present in ordinary yeast. There may be processes, other than inverse ones, in other worlds or in other stages of life. At present the quantitative is, as a rule, inexplicable to us in terms of the qualitative, and vice versa, but a time will come when all such riddles will be solved. Even now we see how chemical combinations produce new values and how distillations and repeated triturations bring to light a quality which makes even an infinitesimal quantity equal in power to the greatest. The reproductive nuclei have apparently such quality. Probably all micro-organisms also have such quality. But the necessary equations have yet to be discovered in this field of knowledge, and in the field of mental and moral science. Meanwhile you have sufficient materials for the thought that the True

Self of all, the mightiest in the mightiest and yet the humblest in the humblest, can be found in His "leasts" on account of His non-egoistic nature, and every eliminant of egoism in you will be a true determinant towards that vision. Can you see God in History, my soul? Most Scientists admit now that there is a Nous in Nature, and the laws they have discovered are its expression, and not the expression of Chance. Does Human History indicate a plan? Is it a "rich product of active Reason?" Is there a positive element in which the negative element of evil is "a subordinate and vanquished nullity?" Has there been a development? How did the State come into being? Has Providence made a clever use of human passions and desires? Has it implanted perfectibility in mutability? What are our consciousness and will for? Are there gradations in them? Was rationality a mere potentiality at first? How did the "empire of articulate sounds" originate? What determines the comminglings of languages and nations? Has each language and nation its own genius? Has that genius a cycle of realization? Does it pervade every department of activity? Is there a genius of the whole of our world? Is Self-knowledge with Consciousness of Freedom its goal? Is Unity of the objective and subjective, of the Real and Ideal its synonym? Is activity its essence? Does it contemplate itself as an objective entity after erecting itself into it? Is interest present only where there is opposition? Has every community, nation and world its infancy, childhood, youth, middle age and old age? Does death ensue when there is no object of actual endeavour and mere *customary* life? Can life issue out of death only when the original principle of activity is transcended? Is the genius of a people, of a world, a *genus*? Does every genus, in the very generality characterising it, carry within itself its own negation? Can a people, a world die a violent death only when it has become naturally dead in itself? If mere desires impel a people, a world, to activity, do its deeds pass over without leaving a trace? Does Time devour all its offspring on this Earth, unless it is divine, unless it reaches the grade of universality which has no past, no future but is an essential *now*? Are the principles of the successive phases of Spirit, animating the Nations in a necessitated gradation, themselves only steps in the development of the one universal Spirit which through them elevates and completes itself to a self-comprehending totality? Is the life of the ever present Spirit a circle of progressive embodiments, which looked at in one aspect still exist beside each other, and only as looked at from another point of view appear as past? Does Spirit possess, in the depth of its present, the grades which it seems to have left behind it? These questions indicate Hegel's line of thought as regards Nations (and logically extended here to worlds) but is that line wholly correct? Has he truly justified the ways of God to man? What has he to say of Slavery? It is "in and for itself injustice," but "for the essence of humanity "Freedom." "The 'natural condition' itself is one of absolute and thorough injustice...Every intermediate grade between this and the realization of a rational State retains...elements and aspects of injustice, therefore we find slavery even in the Greek and Roman States, as we do serfdom down to the latest times." This admission does not promise us a satisfactory solution of our problem! If it is justifiable to dismiss Negro-Africa from further consideration on the ground that it has no movement or development to exhibit, may it not be that this little earth itself is to other worlds what Negro-Africa is to Hegel? May it not be that we can never understand God unless we always keep before our minds the image of a vast cosmos, in which our little planet may be just at the stage o

Negro civilisation or the civilisation of the aborigines of Australia or Siberia, in comparison with the civilisation in other worlds? May it also not be that our Earth may be something like the Anadamans to other spheres, and hence the evil we see here? "Why, all the souls that were, were forfeit once" may be expressing a great truth, and, its truth will show how gracious God has been to the fallen and the graceless and the ungrateful, and how all the old traditions of a golden age and of a fall, have arisen, and why every people has its ideas of a world higher than this earth and of a world even lower than this earth, the popular heaven and hell. Great Upanishadic thinkers said long ago that this earth was for those who are neither wholly good nor wholly evil, and if we only bore that fact in mind, what a change would there be in our angle of vision?

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The environment on this planet, is just that which is suited to creatures neither wholly good nor wholly evil. In the Uplands we find herdsmen with plenty of leisure. They have their compensation. What splendid health they enjoy! And does not all history owe a deep debt to them for freshening the dullness of the plains? The plains devoted mainly to agricultural and industrial pursuits have their compensation in greater enlightenment, just as the sea coasts have theirs in commerce, navigation and independence. It did not strike a Chinese, an Indian or a Babylonese that there was any injustice to the Uplands, and it did not strike the Uplands which sent forth invaders and conquerors that there was any injustice in their conditions. To give us all a fair chance of redeeming our mixed past, we have not been endowed with the memory of our past elsewhere, but we are where science, poetry, philosophy and common observation agree in saying, there is a conflict raging bet een evil and good, the particular and the universal, desires and duty, the emotions and the intellect, Life and Environment. All the while, He who could have annihilated us, has chosen to be everywhere with us and to help us if we but repent and mend our ways. How we respond is shown by our fratricidal wars, by the drink bills and the munitions bills and the strike bills and the lockout bills of the principal nations, by the egoism of oligarchic Imperialism, by the crimes of the bureaucracy, by the tyranny of vested interests. Nevertheless we can see that, under God's providence, we have survived cannibalism and slavery, and that good somehow has been arising even from evil, and modifying its fatal character. There have been repetitions of majestic ruin due to selfishness, but pride, the vice of fools, is still a factor to count with, even in the modern world with its strenuous endeavour to attain to self-determination and a comity and peace and co-operation, safeguarded by a League of Nations. History, on the whole, shows us how vile has been humanity, and how good God has been to it, and how patient. No practical statesman or legislator has ever acted on the assumption that man is not responsible for the crimes he commits, nay, even the most consistent determinists, become inconsistent when asked to apply their doctrine to legislation, or even to themselves. Spirits in the world higher than the world of mathematics, or the spirits of this last world may have had a great deal to do with humanity as we find it in History. If none of them was a free agent, if there was no voluntary descent of angels, if even God Himself is unable to create a free agent, then all our moral distinctions and laws are a mockery, and God cannot be vindicated at all, unless we drop the relativity of knowledge, and say that the Absolute is everything and all that we see, including ourselves, are merely His playthings. Those who can transcend both Time and Space may require no explantion, but those whose

knowledge is relative have a right to demand an explanation of their existence from Philosophy, and a Philosophy that cannot give it, must be held to be a failure. There should be given us at least a good working hypothesis, and no such hypothesis has yet been given which has ignored the continuity of life and the Nemesis that dogs all wrong and the fact that there are more worlds than are dreamt of in our philosophy, that there are gradations of being, that all is not what it seems, and death means merely change and if it is a poison it contains an elixir. We are free, for all practical purposes, says Sir Oliver Lodge, but *not lawlessly free*, for " we are controlled as being intrinsic parts of an entire cosmos suffused with law and order." That is also a solution worth bearing in mind

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Who have been the organs of World-History? The Yellow Race is looking up and may have its turn. Even the Negre may have his turn : it may even be said is sure to have it. He may be in what Kapila would have called a state in which Tamas (inertia) is predominant. But Tamas involves within itself Rajas (Energy) and Sattwa (Luminosity). Spirit is involved in all the three principles and its evolution in Time and Space on the Earth is gradual. In geological time objective solidarity has been achieved. To achieve subjective solidarity, our little world may require as much time. What cycles humanity has gone through we do not yet compeletely know. Egypt and India and even China are still like the Spinx of old, and until all the facts are discovered, a true science of history, a science enabling us to make even forecasts, may not be possible. We can only frame a working hypothesis and apply the scientific method of trial and error.

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There is other history more illuminating and more provocative of thought. "Mud" it is said "gives us our chronology" and Huxley in his Lay Sermon on a piece of chalk, has said, deliberately, that the man who should know the true history of it, " though ignorant of all other history, is likely, if he will think his knowledge out to its ultimate results, to have a truer and therefore a better conception of this wonderful universe, and of man's relation to it, than the most learned student, who is deep-read in the records of humanity and ignorant of those of nature." The chalk, according to the evidence he adduces "is vastly older than Adam himself, older than drift or boulder-clay, older than England, France, Germany, Poland, Russia, Egypt, Arabia and Syria, for it is "the dried mud of an ancient deep sea," preserving the remains of more than three thousand distinct species of aquatic animals" among its fossils, and, " it is by the population of the chalk sea that the ancient and modern inhabitants of the world are most completely connected." Examining with a microscope, Huxley found in a cubic inch of some specimens of chalk "hundreds of thousands of the calcareous skeletons of the minute globingerinæ" compacted together with incalculable millions of the granules making up the matrix. These little creatures flourished in multitudes more numerous than the sands of the sea-shore in the bottom of the ancient sea, and they played a great part in building chalk cliffs, during the goelogical alternations of land and water.

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Whence did the globingerinæ get their supply of lime for building shells which have built up those cliffs-cliffs wall-sided with "vast needless and pinnacles standing out in the sea, sharp and solitary enough to serve

as perches for the wary cormorant". These tiny organisms got their lime from the igneous rocks belched forth by volcanoes, which at one time bossed the crust of the earth "like shagreen" and soaked the sea-water with lime. But how did lime come into the igneous rocks? From the Earth which got it from the Sun, when the two parted. And the Sun has kept the sea-water going. "Save for the sun, the volcano steam would have just collected in depressions in the earth's crust, and the only motion of the water would have been the motion of the tides. But the sun raised the water into the sky, where it condensed into drops and clouds on the nuclei of volcanic dust. and then, pulled down by gravitation, fell as rain, and made streams and rivers." The sun is thus hid in the lime of our bones, as in the rest of our body. This history is more ancient than any annals and gives you food for meditation, my soul.

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Science says my dermis is covered with a 'corpse,' for the epidermis has horny scale—like cells. But in this corpse open the mouths of sweat-glands whose number is about two and a half million? They represent "a length of tubing of twenty to thirty miles" and their orifices represent "an area of ten thousand square feet!" In the sub-cutaneous tissue are branches given off by a network of arteries from which fine capillaries pass into the papillæ, while other branches feed the sweat-glands, the hair follicles and the fat. And there are, besides, networks of lymphatics, and of nerves—nerves in the touch-corpuscles, nerves entwining hair follicles, nerves to the plain muscular tissues of the hair muscles and to the muscular coat of the blood-vessels. The arteries contain blood, and in a single drop "there are about 5000,000 red cells, and 20,000 or 30,000 white cells." If all of them, says Macfie in his "Romance of the Human body," were arranged shoulder to shoulder in single file, they would stretch over 200,000 miles, more than two-thirds of the way to the moon. The capillaries stretch for thousands of miles. In the lung alone, they "are long enough to stretch across the Atlantic." The heart, in 24 hours, by its systole and diastoch, does sufficient work to raise itself about thirty times to the top of Ben Nevis, The blood is impelled in a circle through millions of tubes and tubules, and is in a state of ceaseless motion, like our Mother Earth. "Probably a drop of blood goes, on the average, nearly a mile a day." A nerve centre at the base of the brain, and in constant communication with all parts of the body, sends its orders to the heart through the vagi when its action is to be slowed. The respiratory nervous centre has command over innumerable cells in the mouth, the nostrils, the larynx, the trachea, the bronchial tubes, and the lungs. "Roughly speaking, by the time the capillaries of the lungs have been filled thirty times with blood, 3300 square yards of blood-cell surface have had an opportunity to take up oxygen, and a river of blood some 200,000 miles in length has had an opportunity to give up carbon-dioxide to the air in the air-cells." The lungs, like the heart and the sea have their ebb and flow, for the rib-muscles and the diaphragm expand the chest cavity about sixteen times a minute, and contract it also about sixteen times a minute. To filter the air, the turbinals in the nose and in the air tubes have been supplied with hair-like processes on the mucous membrane. If foreign substances or micro-organisms elude these processes, tho army and navy of the body—the white corpuscles—come into play unless the body has been much sinned against, and their resisting power lowered. "A balance is struck between income and expenditure," and the needs of all the tissues are carefully attended to, and the temperature is maintained steady. Our alimentary canal resolves things derived from the vegetable or

animal kingdom into carbohydrates, preteins or fats, and finally the carbohydrates are converted into sugar, the proteins into amino-acids, the fats into fatty acids and glycerine, and the sugar is lodged in the Sugar Bank, the Liver, in the form of glycogen, while the amino-acids are absorbed by the blood-vessels and the fatty acids and glycerine by the lymphatics, in the small intestine. The liver builds up complex fats called phosphatides, which like lecithin and cholesterin, are nerve constituents. It also forms bile. In health, the filters in the Kidneys do not allow albumin or sugar to pass through, and the spleen see to it that worn out red corpuscles are destroyed and, co-operating with the lymphatic glands, sees to it that new white ones are formed. The Builder in us builds up the red corpuscles in bone marrow and his tiny bondmen work up the lime in our foodand chisel the bones, correctly according to specification ! Meditate, my soul, on all these wonders and worship the Wonder-worker who lodges all these potentialities in a single small cell !

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The most wonderful memory is that of cells which know when and where to produce the proper diameters and shapes of blood and lymph and other fluids, of epithelial, connective, muscular and nervous tissues, and numerous other things. Whence comes that memory ? Each of the principal tissues is of various kinds : How do the cells know that, out of the various kinds, one and not the other should be used for certain purposes, one, for example, for sensory nerves and another for motory nerves, one for voluntary muscles and another for the involuntary ? Think of all the marvels of areolar, fibrous, elastic, retiform, adipose, lymphatic, cartilaginous, and osseous forms of connective tissue, of the epithelium of the skin, the mouth and the end of the alimentary canal, the cardiac muscle, and the material of the cerebrum and the cerebellum. Students of Anatomy find it most difficult, without repeated dissections, to distinguish all the parts of the body. How have the cells come to be endowed with an unerring memory as to all these parts ? There is endless differentiation in Nature. There is not only a fixed number of chromosomes for each species (for the human species the fixed number is 24), but the diameters of the blood corpuscles probably differ in each species, and it is said, the red corpuscles in mammals are bi-concave, while those in the vertebrata below the mammals (e.g. in the ovipara) are bi-convex. Then there are the forms of fingers and toes made with such variations as to make tracking and detection of crime possible. Is all this work done by mindless cells springing from the zygote by the union of sperm and germ ? The human ovum is smaller than the dot of 'i', but it has been calculated, it "contains 8,640,000,000,000,000,000 atoms combined together into 1,728,000,000,0 0,000 molecules". How is memory enclosed in such infinitesimal particles, and in particles far more subtle, the electrons of science ? Who has endowed them with this miraculous power, with a waking life, a dreaming life and a life in sleep, with recuperative and reproductive functions, with affinities for various things, positive and negative ?

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'Positive' and 'Negative' appear to science to be two aspects of Nature, and they seem to science to be all-pervasive and at the bottom of all existence, of all development, and of all multiplication by division. Karyokinesis or mitosis is apparently as much their result as anabolism and katabolism, kations and anions. Schafer says in his "Histology' "Sometimes the result of a stimulus is to cause a cell or organism to move towards the source of excitation (attraction), in other cases, the movement

is in the reverse direction (repulsion). The terms positive and negative, chemotaxis, phototaxis. thermotaxis and the like, are used to indicate the nature of the effects produced by various forms of stimulation". He also says: "The appearance of the division spindle and even the changes in the chromosomes can be imitated experimentally by introducing differences of electrical polarity in a solution of electrolytes containing particles in suspension. It is, therefore, not improbable that they are naturally brought about in some such manner." But who or what is working the differences in polarity? Assume that on this planet, life is a stream with opposite currents in its waves. Assume that it resides in those parts of the cell which no human ingenuity has yet been able to stain? Does Science know what it is, or how under its influence minute particles faithfully produce the characteristics of each species, and individual heredity, with mathematical precision? Truly how the One becomes the Many is symbolised in both Ontogeny and Philogeny. "Deep is history in man, even though he may not be alive to it," says Lord Morley in his "Recollections" (the title of which, according to Frederick Harrison should be "Recollections and Meditations"). Deep is history in every cell, even though we may not be alive to the fact. It is that deep history in histology, which gives some men "a genius for picking up pins" and others a genius for going out to meet the Devil even before the latter has made his appearance or made up his mind to attack them. It is that deep history, again, which takes us back to our fountain-head. The cheapest thing in this world, paradoxical as it may seem, is Infinity, for Life is Infinity, and we are surrounded by Life and the Infinitely Great and the Infinitely Small. The potentialities of Infinity in every infinitesimal thing, are most wonderful and speak of Deity everywhere.

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The power exhibited by the Cell is not even a decillionth of the power of the Spirit residing in it and everywhere, the power of lowliness, the power of Sacrifice. The Yogic, Vedantic and Platonic doctrine of Reminiscence is analogically justified by what Science tells us of the memory of Cells. There is, so to say, a Spiritual Cell, and in proportion to its development is developed the Reminiscent power of the soul. Hence, variations in the experiences of those who have communed with the Unseen. There is Infinity in the Spiritual Cell, and infinite is the number of mansions in it. Moses went to one mansion and sought the emancipation of his people, and a land flowing with milk and honey for pious Hebrews and he secured both. Muhammad went to another mansion, and sought the emancipation of the Arabs from idolatry, and a Paradise for pious Muhammadans, and he secured both. The Bhakts, Saints and Sufis go to a third mansion, and seek the bridal of the soul and secure it. Some Vedantis and Nirvanis go to a fourth mansion, and seek to be blended with the Paramatama as rivers are blended with the Ocean: others wish to preserve their individuality, even though blended. There is nothing which cannot be obtained from one mansion or another, and they never suffer the least loss. Take the Full from the Full and yet the Full remains.

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In every nation and is every country testimony has been borne to the reality of the Unseen, for the Unseen is everywhere. As Moses said when about to die, "The word is very nigh unto thee, in thy mouth, and in thy heart, that thou mayest do it." The word, the commandment he commanded, was not in heaven or beyond the sea, and none had to go over the sea or up to heaven to bring it. Among the people whom Moses wanted

to overcome was Balaam, who had his "trances with eyes open." Who taught him the secret of meditation and communing with the Unseen? Abraham and Jacob, Joseph and Samuel, Isaiah and Jeremiah, Ezekiel and Daniel had their Visions and their Voices. Muhammad, enfolded in his mantle, knew of the Night of Power, "which excelleth a thousand months"—the Night, wherein "descend the angels and the spirit by permission of the Lord for every matter, and all is peace till the breaking of the morn." The saints and mystics of Europe have also had their experiences of the Unseen, and, paradoxical as it may appear, every great philosopher, mathematician, poet, painter, sculptor and inventor has had his. The wireless network of Marconi on this earth will soon be an accomplished fact, on account of such experiences, acknowledged or unacknowledged. It may bring a commercial millenium to the materialist, but there is something higher than such a millenium. The face of Moses after his meditation on the mount for forty days and forty nights shone with such effulgence that it had to be veiled: was he not of more value than all the riches of the Rothschilds and of other Jewish magnates in the whole world? Jesus, also meditated in the wilderness for forty days and forty nights and, like Buddha, refused the empire of this earth, for he knew better than those who seek such empire. Every one, communing with the Unseen goes to one mansion or another, and none comes empty thence. Hafiz meditated for forty days and forty nights in a Sanctury, and came out an immortal pœt. Can any one compute his value in Rupees, Annas and Pies. Can any one compute in any currency the value of the fruits of spiritual meditation?

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Is it not selfish to be a meditative soul? "I deny," says Sir Oliver Lodge in his "Modern Problems," that the development of one's highest self can be in any sense selfish. The times when a clear preception of some wide-embracing law is attained, when the splendid harmony and correlation of the universe are even dimly glimpsed—these times more than compensate for the arduous but not ungrateful struggle." The development of one's highest self is true wealth, and it means, according to him, the development of our heart and brain and soul, it means ability "to appreciate the great discoveries that are made in science, to sympathise withhuman struggle and effort, to perceive the beauty and order of nature, to take a worthy part in the life around you, and to participate in the highest aspirations of man." But what are the highest aspirations of man? No onehas yet gone beyond the Yogi's aspirations, the Mystic's and the Vedantist's. They all imply the existence of a world which is not a world of Relativity. But before any one can meditate on such a world, he has to qualify himself by holy work, unless he has already so qualified himself in a previous life sr this life. "By holy work" said Yajnavalkya, "verily a person become holy, unholy by unholy." It is holy work and meditation which enable us to see the Seven Rishis in ourselves, Atri in Speech, Vasishtha and Kashyapa in the Nostrils, Vishvamitra and Jamadagni in the Eyes, Gautama and Bharadvaja in the Ears. It is holy work and meditation which make the head a real Soma cup.

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Behold also the Seven Rishis above and the marvels of beauty in the heavens. There is a cluster of stars in Hercules about which J. P. Nicol has said :" Perhaps no one ever saw it for the first time through a telescope without uttering a shout of wonder." According to the Earl of Rosse, there are thousands of stars in that cluster with perhaps a spiral tendency. It is an" extensive and magnificent mass of stars with the

most compressed part densely compacted and wedged together under unknown laws of aggregation". There is another cluster, called 5 M. Librae which has been described as a "beautiful assemblage of minute stars greatly compressed in the centre" This superb object" says an astronomer," is a noble mass refreshing to the senses after searching for faint objects, with outliers in all directions and a bright central blaze." Another cluster called Toucani consists of a very condensed spherical mass of stars of a pale rose-colour concentrically enclosed in a much less condensed globe of white ones, and Sir J. Herschell has called it " one of the finest objects in the heavens." The same astronomer has described another cluster as " a superb piece of fancy jewellery." It comprises more than one hundred stars from the seventh magnitude downwards, and eight of the more conspicuous are coloured various shades of red, green and blue. The nebula Doradus exhibits a marvellous series, it is said, of convolutions—masses of nebulous matter twisted in and out in singular fashion with numberless black or more or less starless interstices. It is "one of the most singular and extraordinary objects which the heavens present." In the Sword Handle of Perseus, there are crowded fields of stars bordering on the Galaxy. They have been described as "one shining mass of bright points in the whole circular field of the telescope." Two distinct groups of stars have been noticed, and they move in two different directions. Our sun is a member of one of these groups and appears to move in the direction of Lyra. Our whole solar system lies in a mightly stratum of stars in that zone of light of stupendous grandeur, the Milky way. The stars in this part of the sky are apparently moving farther apart 'while those in the opposite quarter of the sky are apparently coming close together. Like the two groups of stars, two groups of nebulæ have been noticed, one green and gaseous, the other white and spiral with a continuous spectrum. The spiral nebulæ seem to avoid the Milky way, not so the gaseous ones. The former are more numerous than the latter and the spiral of each "has two arms with knots of nebulous material at intervals along the arms. George S. Dickson says :"these are to be found in all stages of development. and the suggestion has been made, and meets with a great deal of support, that in these we can see the beginnings and the continuation of an evolution destined to end in the establishment of a system similar to our solar system." Thus what we find in crystals in the Algæ, in the Fungi, in the Bacteria in the protozoa in all forms of inorganic and organic existence we also find in the stars and the nebulæ. Gradations of being and becoming !

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Think of all this, my soul, when you are told that a mere fortutious concourse of atoms is responsible for all the worlds ! Think of the long geological periods in which the great Artist accumulated in His 'leasts' the materials and forces necessary for producing His immortal work on this planet, according to His general plan embracing countless solar systems, some of which are in existence while others have yet to come into being. Think of the tools used by Nature, and the way telescopes and photography have come to our help to tell us of the infinity in the heavens, they themselves being the result of the combination of such humble things as convex and concave lenses and the like. But for the infinity in man could the infinity in the heavens have been discovered with Silicious materials ?

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Flint glass and crown glass are used in telescopes, and flint glass consists of potassium and lead silicates, and crown glass of calcium and sodium

silicates! If there were no silicon, there would be no silicates, no flint, on crown glass, no telescopes! And Silicon is the characteristic element of one of the humblest things in Nature--clay! Nevertheless it is an ally of Carbon and shares with it the glory of being in the sun. If Carbon dispenses light, Silicon used in the telescopes, brings the worlds of light to our vision. Carbon has an amorphous form, so has Silicon. Carbon is present in graphite, and Silicon has a graphitoidal form. Carbon is present in diamonds, and Silicon has an adamantine form. Both are only fusible "at a temperature transcending that which suffices to fuse metals", but carbon molecules have a higher molecular volocity than those of Silicon. Carbon was accumulated by Nature in coal measures, and carboniferous rocks, Silicon in the crust of the earth and in all sedimentary and stratified rocks. The plants get their carbon mainly from the carbon di-oxide in the air, their Silicon from the silicon di-oxide in the earth, their hydrogen from hydrogen mon-oxide (water) in air and earth, their oxygen from these and water and their vivifying light from the Sun. Thus the sun, air, water and earth meet in them, and in the animal life they support. How different are all these oxides! Carbon di-oxide is gaseous, Silicon di-oxide is a non-volatile solid, and Hydrogen mon-oxide is a liquid! But all the three co-operate with one another. "Silicon is absorbed (by plants) in the form of soluble silicates, and possibly as soluble silicic acid. The silicates are brought into solution to some extent by the carbon di-oxide present in the soil, and also by the acid sap of the root-hairs", water helping throughout. All soils contain such an abundance of silica that no artificial silica manure is necessary. Silicon is found in grasses and rushes as well as in cereals, in quartz crystals as well as in brilliantly coloured hyacinths. Coming from the sun, it can take us back to the sun: such is the might of its Lord, and yours. O Thou Indestructible Incorruptible being, the Antaryamin, the Inner Ruler of all that is visible or invisible, teach me to love Thee. Thou art the Sutra Atma—the Thread—Thine is the Warp and the Woof of the Waters, of the Wind, of the Atmosphere, of the worlds of Aditya, of Chandramasa, of the stars, of the gods, of Indra, of Prajapati, of Brahma! What is above the heavens, what is beneath the earth, what is between heaven and earth, and they two themselves, what is past, what is present and what is to come are all woven and re-woven, according to the Upanishadic teaching, upon Æther, and Æther is woven and re-woven upon Thee! The elements, the vital breath, sperm and germ, speech, eye, ear, mind, are all from Thee. Unseen Thou seest, unheard Thou hearest, unminded Thou mindest, unknown Thou knowest! That is what I have been taught. I have been also taught that the Sun resides in my sight, Agni in the black of my eye, Indra in the white, Rudra in the red, Parjanya in its water, and the heavens and the earth in the upper and lower eye-lashes. All these powers are worshipping the Central Life in me, which is from Thee and without which they are as chaff or stubble. And yet no one can describe Thee. Thou art not in the body as seed in a fruit, as water in a cocoa-nut, as the image of the Sun in the Sea, or even as a Quality in a Substance. The worlds are but sparks from Thee. All Beauty is from Thee and all the Love we know of, Mother's or Father's Brother's, Sister's, Wife's or Child's. Beauty and Love are our mainstay--the collyrium of our eyes, for they help us to envisage Thee as far as we can. Help me to shed my Egoism and my Desires, Help me to approach Thee and love Thee.

* * * *

I wish I could become a troubadour of Thee, the Infinite. But I do not know the science of the ultimates, as I have not yet descended into my nothingness. All my senses have never united into one sense, I have not, "heard flowers that sounded" or seen "notes that shone", and I have not sensed Thee as heavenly music or Uncreated Light. Every one comes to Thy celestial Ganges to bathe therein, and everyone has a report to give of it. One says it was just beautiful, crystal, appetising, invigorating water, another is an Idealist and analyses his thought of the Outer Object and his instrument of thinking, and tries to see what underlies both, a third is full of doubts, is a "metaphysical squirrel running round the conceptual cage", or is a denier of the possibility of certitude, a fourth sees the Spiritual making itself known sensuously, sees beauty and loves it ; to the fifth comes a revelation of truth, to the sixth of goodness, to the seventh of goodness, truth and beauty all in one. The How and the Why of all these differences I do not quite know, nor do I equite understand the need of what has been called the gymnastic of nternity, Thy terrible initiative caress—Pain. I have but faith. Lead e O kindly Light. Teach me to love Thee and be one of Thy "leasts". Be not afraid, my soul. He who can make worlds out of electrons, he who can make diamonds out of coal, and hyacinths out of clay, can make a man out of a brute, and an angel out of a man and the very highest out of the very least.

* * * *

The cosmic symphony, like a picture, is "a unit composed of various parts." The music of our little is a part of that Unit, and its raison d'etre is its relation to that unit. The relations of the various parts of a picture change when it is looked at from different standpoints, "under the different influences of the light". So do the relations of the cosmic symphony in proportion to our spiritual light. We cannot analyse that light, nay, we cannot even analyse our æsthetic sense or æsthetic pleasure. What is poetry in its essence, was a question put to St. Augustine, and his reply was : 'when you ask me, I don't know ; when you do'nt ask me, I do." Similarly no one can say why a particular poem or a particular piece of music, painting, sculpture, or architecture has a charm for him. The cause is to be found in the fact that spiritual and æsthetic emotions have something in them which take us out of ourselves, something removed, wholly or partially, according to their intensity, from Time, Space and Casualty, something derived directly from the fountain-head of all Beauty and Truth and Goodnes. The intensity of these emotions varies inversely as the quantum of our egoism, and directly as the quantum of its neutralisation, for egoism is the great centrifugal force which keeps us at the circumference, and the more it is neutralised, the more is our approximation, on our own special radius, to the centre of our circle, the centre which is also the centre of infinitely various circles, the centre of the whole cosmos.

* * * *

Yes my soul, you cannot do better than meditate on the Divine art, on the divine symphony, of which even the least part is not only endowed with consummate proportion, balance and symmetry, but with the power of graceful self-development, with unceasing variety and freshness, and above all with a marvellous fulness of response to the senses, the intellect and the emotions and to all that is highest in man or angel. The weaving of two or more melodies has been likened to the building of a solid beautiful edifice, and it is said: "in a well constructed piece of music every

musical theme has a value for its own sake and also for the contribution which it brings to the general scheme." Similarly it has been said that "the various colours and gradations of colour in a picture have a content of their own just as the individual notes of a sonata, but they have a marked influence on those surrounding them, and their worth is known only when the whole is grasped." If this is true of human works of art—mere fragments of the Divine art—how much more is it necessary to grasp the whole when looking on God's work. Truly the Beauty and Truth and goodness hid in every Point become luminous and splendid, when you connect the Visible with the Invisible, the Discontinuous with the Continuous, the Finite with the Infinite, the Differential with the Integral.

* * * *

The Rishi of the Ishopanishad said of Thee, my God: "It is motionless, One, faster than mind, and the Devas could not overtake It....Sitting, it goes faster than those who run after it. By It, the all-pervading Air, supports the activity of all living beings...He pervaded all, resplenden , bodiless, scatheless, having no muscles, pure, untouched by sin, far-seeing. omniscient, transcendent, self-sprung, (he) duly allotted to the various eternal creators their respective functions." St. Augustine said of Thee: "What art Thou, then, my God?...Highest, best, most potent, most omnipotent, most merciful and most just, most deeply hid and yet most near. Fairest yet strongest: steadfast yet unseizable, unchangeable, yet changing all things, never new yet never old.....Ever busy, yet ever at rest, gathering yet needing not: bearing, filling, guarding, creating, nourishing and perfecting, seeking though Thou hast no wants....What can I say, my God, my life, my holy joy? or what can any say who speaks of Thee.?" Thou art the Alpha and Omega, the First and Last, the mystic River of Light and the Perfect Rose, the World of Becoming and the World of Pure Being. And yet every spark from Thy anvil, Master of my soul, has a strange independence and can weave its own warp and woof. It is open to it to live its life, in harmony with any of its *koshes* (sheaths), it is open to it to rise to the Dashamodwar, the gate at the apex of the spirit, where Thou art knocking and calling to Thy Prodigal Sons. Help me rise t o that apex.

* * * *

An Upanishad speaks of the world of the Fathers, the world of the Mothers, the world of the Brothers, the world of the Sisters, the world of Friends, the world of Scents and Garlands, the world of Food and Drink, the world of Songs and Music, and the world of women. All these are expressions of Thy creative joy, my Lord, and no world, according to another Upanishad can give us the joy of union with Thee. Narada said to Sanatkumar that he knew the Vedas, the sciences and the arts, but not Thee. "I am only like one knowing the words, and not a knower of Self." He knew but Names of the One Reality: but had no actual spiritual experience of It. Meditating on the Name as God and becoming independent so far as Name could reach, meditating on Speech as God, meditating then successively on Manas (mind), on Samkalpa (Will), on Chitta (Intelligence), on Dhyana (meditation), on Vignana (Experiential knowledge), on Bala (Power), on Anna (Food or Solids), Apa (Drink or Liquiss), Teja (Luminosity), Akasha (Æther), Memory and Hope, he could not acquire the independence which union with Life and Spirit alone could give. Teach me, my Lord, that excellent science. Merit I have none except that of aspiration and quest. Show Thy face to me.

Emanations appear to us from Thee the Immanent. All the jewe'ls we have are Thine, and their settings also. The complementaries are Thine, the correlatives are Thine, the Locks are Thine as much as the Keys, the divisions we make to understand Thee in terms of Time and Space are as much Thine as Thy Eternity. Self-division for unification, diversity in unity are Thy notes.

If I were pure, never could I taste the sweets
Of the forgiveness of sins. If I were holy, I never could behold the tears
Of Love.....O Mercy! O divine Humanity!
O Forgiveness, O Pity and Compassion! If I were pure
I should never
Have known Thee.

So sang Blake, and so sang Ravidas to Thee Who art not only the extremes but the link between the extremes, Who art Thyself and Thy other and the meditator between the two, Thine is the still wilderness, Thine the lonely desert.

Thine the Shrine in the Desert
Thine the Oasis, Thine the Birthplace
Of the Pilgrim and Thou art his journey's end. Blessed be Thy Name.

* * * *

Art Thou Universal, Particular and Individual? Art Thou Self activity in these forms? Art Thou the Potentiality of all forms, as a Universal, and yet formless? Art Thou that which Thou determinest as well as the power determining? Art Thou the Self-consciousness which finds itself in all that it thinks? Art Thou that self-moving Life, "the origin and beginning of motion, the eldest and mightiest principle of change"? Art Thou active Reason and passive Reason, the only *causa sui*, the supreme *causa efficiens* and *causa materialis*? Art Thou all particularity "as active determiner opposed to passive possibility of being determined" as efficient cause opposed to material cause? Art Thou individuality in the annulling of this opposition by transfer of energy from active subject to passive object "so that the object becomes self-active"? Dost Thou become another to Thyself, to return to Thyself? Ever relating, ever negating, dost Thou, as Law, conceal Thyself in the complex of forces and manifestation of energy, in cause and effect, in actuality, within the sphere of our understanding? Dost Thou become " an internal whose essence is to become external" in that sphere? Dost Thou become phenomenal with force as Thy form and the content of force as Thy manifestation? Dost Thou then give rise to the Ground which is the unity of Identity and difference and to Phenomenality? Dost Thou next pass from the dynamic to the static, to the equlibria of forces and give rise to Measure, Quantity and Quality, the sub-categories of pure abstract being? Can I rise from the transitions of being to the reflections of the Essence, and thence to Thee as Subject-Object in Thy Absolute Truth? Can I see Thee thus everywhere O Thou Infinite—all-good, all-beautiful? Show me the way to Thy presence O Lord.

* * * *

OThou Supreme Reason, Absolute Idea, Absolute Thing, Absolute Person, is the truth of Thy necessity my freedom? Am I most independent when I know myself to be determined by Thee? Why dost Thou appear so mutilated in Space and Time? Why hast Thou become the great "puzzle of the one and the many, the same and the diverse"? O

Thou Inscrutable World-Organism, what is Thy morphology, what is Thy biology, what is Thy psychology, what is Thy ethics, what is Thy logic, what is Thy ontology? Why do art, science, religion, and philosophy present us with so many half-truths, so many mere aspects, mere phases, mere shades? Is there any part of Thee, O Infinite Reality, which can stand for Thee as a whole? Hast Thou any parts at all? Art Thou a Musician with a score, a theme and a purpose and are all the worlds Thy orchestra? Art Thou ever—present in Nature, in Language and Thought? Art Thou present in the Relative, O Absolute? Can Relativity be ever negated and a science of ultimate Reality constructed? Dost Thou live entirely in Thy children, or art Thou both Immanent and Transcendent, both self-concealing and self-revealing? Do you wish to preserve the personality of Thy children? Are they architects of their own fortunes? Why do some of them feel they are free, while others feel they are not? Hast Thou a Night and a Day? Is the Abstract Absolute a spectre of Thy Night, and is the True Absolute that which actualises into concrete being, into differentiated being, even into transient being and related being, into single facts and double facts—that which is "for itself and also *in* and *for* itself"? Do you require, only in our world or everywhere, plus and minus symbols, names, numbers and measures, and appearances minor and major? It is said that Thy infinite kindness "lends existence to the passing stages" of Thy own show in Thyself, and that we have reason "to rejoice that the things which environ us are appearances and not steadfast and independent existences, since in that case we should soon perish of hunger, both bodily and mental." But is there any Law of Development, of Relation or Transition, ontological or non-ontological, which is independent of Thy will? Hast Thou a heirarchy of worlds of which ours is a mere low unit? Bring me into Thy sunlight. Make me at one with Thee, at home with Thee. Separation from Thee even for an instant means loss of life. If I isolate myself from Thee, I become "a mere show or seeming, without stay or essence." Then what is appears different to me from what it ought to appear. Then comes my apparent bondage to seemingly blind Necessity. Then I feel no consolation and find no Theodicee. Then my consciousness is like the mere surface of the ocean, without its depth and breadth. Give me both O Gracious one. An endless chain of dependence has riveted itself on us, on account of our own acts. But hope has not left us, and even our illusions are Thy mercies. Teach us to be of your "leasts" for the great become infinitely Great then only when they become Thy "leasts:" such is the power of humility, such the strength of weakness. My organism of thought is still but a seedling. Let it mature and bear fruit, under thy holy providence and fatherly care. Once more, make me one of Thy "leasts."

* * * *

Egoism is hard to extinguish, my soul. But be not disheartened. The path is strait, but the goal is not unattainable. Let the lives of all the Blessed ones guide you, and bear constantly in mind their unanimous testimony: "where there is' 'I' Thou art not, Where Thou art, there is no 'I'" It is clear therefore, to fill yourself with God, you must cast out Egoism. A frog living in a well cannot form the idea of a sea: so you living in your little self can form no idea of the Greatest Self of all unless, you remove your enclosing narrowing limitations. Do a goodly clearance with impregnable faith, and then open the inlet which connects you with that mighty Ocean, and the Ocean may roll in and transform your little well, out of all recognition.

We see how Air assumes various forms, how Fire assumes various forms, how the Sun, the eye of the Solar System, assumes various forms, and yet remains untouched by any of them. So Æther, the Father of them all, can remain within all and yet without them. And there is One, higher than Æther, the Timeless, who also remains within as well as without, in the world of Relativity, as well as where the Sun shines not, neither a moon, nor a star, nor lightning, nor a fire, where all the suns of all the solar systems are as it were fuel. These are all old Upanishadic thoughts and Science is revealing their grandeur and their mighty truth. Do not lose sight of them, even for an instant, my soul.

* * * *

O Thou the beholder of all beholding, the hearer of all hearing, the thinker of all thinking, the knower of all knowing, the truth of all truth, be Thou, my lodestar, be Thou the cynosure of my eyes, be Thou, to me, dearer than a son, dearer than wealth, dearer than any other thing, dearer than all. Whosoever worships Thee as dear " to him is not dear a perishable object". He abandons all wordly desires, for " the uninterruped recollection of the knowledge of the Soul is to be effected by dependence upon the force of abandoning all worldly desires". That is what Shankaracharya has said in his commentary on the Brihadaranyka, and that is exactly what Buddha taught, and what Socrates taught in the Phædrus. That is exactly what Christ meant when he said " My kingdom is not of this world." That is what the Sufis say and that is what the Bhaktas and Mystics say. The Yoga Sutras and the Brahma Sutras say the same thing. The world which is not of Relativity is never reached by one who cannot draw in the senses and desires into the Æther of his heart as the Spider draws in his web.

* * * *

Dædalus was doubtless taken to be a mad man. He attempted to fly and was killed, but man can now fly successfully. How did he learn to fly? He studied the tiniest things that could fly, insects and birds. He collected data concerning their locomotion. He computed the normal pressures upon oblique planes in terms of the sine of the angle of incidence, and discovered that " concave bird-like surfaces afforded from three to seven times as much support as planes at acute angles of incidence." Kite shapes with flapping vanes, two pairs of wings and a tail with propellers, arched surfaces over planes with concave bat-like wings and many other devices were tried, and experiments made on air reactions, until the underlying principle of æronautics and the requisite formulæ were found. The apparatus must be such as " to reduce to a minimum all resistances to propulsion" and in spiritual ascents that is secured by becoming" a least " of God. A centre of symmetry (springing from deep love) and inexhaustible perseverance are also necessary. Work hard on these lines, my soul and you too may ascend into the empyrean. O All-great and All-loving one, how often I forget Thee! A poet sings:

"All the breath and the bloom of the year in the bag of one bee:
All the wonder and wealth of the mine in the heart of one gem:
In the core of one pearl all the shade and the shine of the sea:
Breath and bloom, shade and shine,—wonder, wealth, and how far above them—
Truth, that's brighter than gem,
Trust, that's purer than pearl.
Brightest truth, purest truth in the universe-all were for me
In the kiss of one girl."

How much more must there be in a kiss of Thee, Lord, whole and sole, of heaven and earth ! How much more even in a glimpse of Thee, Who can match Thy beauty, the cause of the irradiation, of the charm and the might of all beauty ! Grant that my nature may blossom into beauty, grant that my soul may win Thee. In Thy face is light, and even in Thy shadow, there is healing ! If Thy light is not for me, let me be healed by Thy shadow.

Beauty is not external to thee, my soul, nor is Truth nor is Goodness. Exoterically, you need things for your validity, as things need relations for theirs. But spiritually, there is a bond between thee and the eternal verities. Find out what thou hast a natural affinity for, and make it a stepping stone on the higher path. " The true order of going...is to use the beauties of earth as steps " towards celestial beauty: going thus " from fair forms to fair practices, and from fair practices to fair notions, until from fair notions " you arrive at " the notion of absolute beauty and at last know what the essence of beauty is."

I have not passed my probation time, wholly to my satisfaction, and once I felt, if I remember aright, that

" 'T was fitter spirit should subserve
The flesh, than flesh refine to nerve
Beneath the spirit 's play. "

I did not understand what all partial beauty was a pledge of. I did not understand that the finite was intended to lead to the Infinite, that " the arras folds that variegate the earth" were but Thy ante-chamber", my God, that even our failure here is " but a triumph's evidence for the fulness of the days." Love alone can teach me to understand Thy ways of Love. Love alone can teach me why limitations have been placed on the life of us Thy children. Love alone can teach me why Perfection is so hard to attain on this planet. Innumerable are Thy worlds and who am I to judge Thy illimitable Beauty and Bounty by what I blindly see here and hardly understand. Help me to press Thy lamp" close to my breast," help me to feel Thee within myself, and to will union with Thee.

* * *

Once I cried out to Thee :

" I repent, I repent, my Lord. I know I must have sinned : otherwise I would not have been sent to a world of such physical diseases, as those I have been reading of lately in Allbutt's System of Medicine and Allbutt's System of Gynæcology—to a world of such moral diseases as those of which I have read in Russell on Crimes and historical books—to a world which makes even good men pessimists or atheists. I repent, I repent, my Lord—for I know Thou art merciful and loving. and when even Thou hast found it necessary to send me to this world, I must have sinned deeply. May my brothers and sisters in this world realize their sinfulness, and may what Dr. Sinclair has written about Cancer be never written again : " If we could place all the lower orders who suffer from privation and depressing environment for a generation or two in the position of the more favoured, we should stamp out Cancer." Thou O Lord hast made us and Thou art just. " Become the broken stones of the road," but they would hurt the traveller's feet. God's servant should, therefore —" be as the dust of the earth." But dust flieth and falleth on men's bodies. God's servant should, therefore, be like water " which cleanseth all the limbs." But water becometh cold or hot according to the season. God's servant should, therefore, (says Kabir) be like God Himself, God the

Sat Guru, who, according to Nanak, is even, a Dás of Dáses, a servant of servants, though matchless in power, and in beauty and in majesty Truly He is infinitely Great, because He can make Himself infinitely Small.

* * * *

"We go to our own, when we sleep," said Uddalaka to his son. The mind goes to the Prana, the food goes to its carrier, and the drink to its carrier, and all three are rooted in what? *Sa ya esho anim aited atmyam idam sarvam.*" Strike at the root of a large tree, strike it in the middle, strike it at the top : so long as its sap flows in it, it will bleed but live. "*Sa ya esho anim.*" Put a pinch of salt in water and taste it from the surface, from the middle, from the bottom. How tastes the water? "*Sa ya esho anim*" again. Wonderful truly are God's "leasts," his invisible 'leasts' that give us our sight, our hearing, our touch, our taste, on smell, our sleep, our life !

* * * *

O Thou Immanent Transcendent, Nirguna, Amatra, Adwait, One without a Second, Without Parts, Unshadowable in Words ! Is it possible to reach Thee in Thy own world of what the Masnavi calls Kudrat? Thou art above "Is" and "Is not," above all "Has" and "Has Not," above all "Ought" and "Ought Not," of this world of Hikmat, of Cause and Effect, and yet all these are from Thee. Thou art He that is for Ever and Ever, and yet Thou hast a Nought around Thee. That is complementary to Thee and is the Ever-Becoming. Hence, Science find complementary strain-forms in its present ultimate paradoxical Æther, complementaries related to each other as an outer image to its reflection in a mirror, as a right-handed screw to a left-handed screw. The complementaries exist in the paradoxical electrons, of which every sub-atom in an atom consists. They exist, therefore, in the atoms of Chemistry and Physics, and, therefore, in all the elements, and, therefore, in all the heavenly and earthly bodies. Hence we find them in all cells and in all the products of cells, in life and death, intelligence and non-intelligence, bliss and misery, beauty and ugliness, truth and falsehood, good and evil, action and re-action. Omnipresent One, Paradoxical One, infinite and various are Thy forms, causal, subtle and concrete, in this World of Sequence; infinite and various are the forms of Thy Necessity which is Freedom—of Thy Freedom which is Necessity, of Thy Dependent Variable, Nature, which appears an Independent Variable—O Ever-Constant. Make me Thine and be mine.

Finally say, with Guru Nanak, my soul :

"Were I to live for millions of years and drink the air for nourishment;

Were I to dwell in a cave where I beheld not sun or moon, and could not even dream of sleeping,

I should still not be able to express Thy worth ; how great shall I call Thy name ?

O true Formless One, Thou art in Thine own place—

As I have often heard I tell my tale—If it please Thee, show Thy favour unto me.

Were I to be felled and cut in pieces, were I to be ground in a mill;

Were I to be burned in a fire, and blended with its ashes,

I should still not be able to express Thy worth ; how great shall I call Thy name ?

Were I to become a bird and fly to a hundred heavens ;

Were I to vanish from human gaze and neither eat nor drink,

I should still not be able to express Thy worth ; how great shall I call Thy Name ?

Nanak had I hundreds of thousands of tons paper and desire to write on it all after the deepest research ;

Were ink never to fail me, and could I move my pen like the wind,

I should still not be able to express Thy worth ; how great shall I call Thy Name ?"

What is it you want, my soul? Bow down at His Lotus Feet and pray that he may empty you wholly to fill you with Himself. He the Master of many Mansions is yet Lowlier than the Lowliest. Surrender yourself to Him. Be one of His leasts and be a sacrifice to His Holy Name.

The Modern Printing Works, ALLAHABLD.

ERRATA.

Page.	Line	Incorrect	Correct.
1	4	Chapter I ...	... Chapter I. Communion
„	25	yet may ...	... may
„	38	life and ...	... life
„	40 & 41	"Open sesame to the spirit" ...	"Open Sesame" to the spirit
2	1	Know ...	... knew
„	51	force ...	... forces
„	52	ao ...	... So.
„	24	Accelleration ...	... Acceleration
„	25	Movement ...	... moments
„	32	incline ...	... inclined
„	33	directld ...	... directly
„	34	youy ...	... you
„	36	effect ...	... effects
„	42	question ...	... questions
„	49	being ...	... Being
3	13	attractions ...	... Earthly attractions
4	10	in heart ...	... in the heart.
„	37	contrast and their use	... contrasts and their uses
„	39	has ...	... has had
„	40	hardner ...	... hardener
„	53	from great ...	... from a great
„	55	the God ...	... thy God
5	28	Why is then ...	... Why is there
„	31	why then ...	... why there
6	17	Evil shall we ...	... Evil shall be
„	28	for Thee ...	... for thee
7	15	in mud ...	... in the mud
„	40	principle ...	... principle of
„	44	this it is ...	... this is
„	48	retaina ...	... retina
„	51	all, this ...	... all this,
8	13	death ? ...	... death !
„	21	world ? ...	... world !
„	22	seal, ...	... seal
„	26	seed. ...	... seed
„	28	h ...	... the
„	30	mo-e ...	... more
„	33	joy, ...	... joy,
„	52	cleave alone ...	... leave alone
„	53	n ...	... in
9	1	beauty ...	... the beauty
„	20	modified ...	... modified."
„	43	moments ...	... moments in
10	22	seems ...	... "seems
„	25	tangible ...	... tangible"
„	30	soul ...	... son!
11	51	Life of lives ...	... Life of all lives
12	15	synthetise ...	... synthetise,

Page.	Line	Incorrect	Correct.
12	21	words ...	... worlds
„	2	but ...	... But
13	1	trignometrician	... trigonometrician
„	20	quantities ...	... quantities,
„	31	portion ...	... portions
14	6	straight ...	... stream
„	9	vertex ...	... vortex
„	10	that is molecular rotation	... (that is, molecular rotation)
„	14	the movements	... "the movements
„	16	another ...	... another"
„	„	resistance ...	... resistances
„	26	realiz ...	... realise
„	28	surel ...	... surely
„	30	master ...	... masters
„	32	Natures ...	... Nature
15	3	of life ...	... of its life
„	16	becomes electrons	... become electrons
„	28	Mundouk ...	... Munduk
„	37	again ...	... again about
„	45	and ...	... and are
„	49	thousand ...	... thousands
16	22	Weight ...	... weight"
„	"	from ...	... "from
„	23	these ...	... those
„	32	and" ...	... and "
„	„	coincided ...	... coincided "
„	38	a point ...	... a point,
17	21	takes ...	... takes three and
18	43	' least" ...	... "leasts "
„	46	thing ...	... things
„	52	eight ...	... eighth
19	18	one substance ...	... One Substance
„	30	oxhœmoglobin	... oxhæmoglobin
„	45	jesper ...	... jasper
„	51	soluble ...	... soluble and insoluble
20	14	Helmboltz ...	... Helmholtz
„	43	were also ...	... are also
21	8	electricy ...	... electricity
„	13	generally ...	... generally
„	28	error ...	... errors
„	34	non-metalic, one metalic	... non-metallic and one metallic
23	30	tuning forks ...	... turning forks
24	43	under microscope	... under the microscope
„	45	and ...	... and such
25	20	iron ...	... iron
„	„	How ...	... how "
„	21	passage ...	... passage"
„	„	in ...	... "in
„	23	them ...	... them"
„	"	selective ...	... "selective
„	27	t he little ...	... "the little
26	4	octave ...	... octaves
„	10	other ...	... ether
26	27	and of energy ...	... and of the enorgy

Page.	Line	Incorrect	Correct.
26	45	molecule ...	... molecule"
„	46	under ...	... "under
„	47	aseend ...	... ascend
27	47	the existence ...	... "the existence
„	50	upon ...	...:"upon
„	51	orbit ...	... orbit"
„	53	commensurability	... Commensurability
„	„	planets ...	... planets"
28	6	point ...	... a point
„	7	a Small ...	... Small
„	14	W. ...	... W. E.
„	15	this ...	... this:
„	18	46 ...	... 4. 6
„	23	if sun ...	... if the sun
„	28	aqueou ...	... aqueous
29	5	wanders ...	... wonders
„	39	a bone ...	... "a bone
„	45	responce ...	... response
„	51	shown ...	... shown by
30	9	from ...	... from a
„	35	(poison) ...	... poison
„	47	crust ...	... crest
„	48	that the crystal	... that shape the crystal
31	23	quite ...	... quiet
32	32	of life ...	... of life—
„	48	invisibles and ...	... invisibles,
33	6	39,000 ...	... 39000
„	33	transmit ...	... transmits
34	5	system ...	... systems
„	8	substance ...	... substances
„	9	"Had ...	... Had.
„	18	aether and with	... aether with
35	15	plant ...	... plants.
„	38	This process ...	... "This process
„	41	potassium ...	... potassium, phosphorus, sulphur, magnesium,
36	6	interlacing ...	... interlacing fibres—
„	7	veins ...	... veins—
„	15	a little knot ...	... "a little knot
37	10	we have once ...	... we have our
38	19	gaseous liquid ...	... gaseous and liquid
39	2	have ...	... "have
„	30	land ...	... lands
„	33	for ...	... far
„	38	Fungi ...	... the Fungi
„	41	crystal ...	... crystals
40	last line	generation ...	... generations
41	2	experiment ...	... experiment"
„	18	gastric, juice ...	... gastric juice
„	32	Allbutts ...	... Allbutt's
„	last	and ...	... and merely do their duty. We
42	50	Sponges ...	... Sponges).
43	39	proceded ...	... proceeded
„	51	have ...	... would have

Page.	Line	Incorrect	Correct.
43	53	god ...	... God
44	5	born ...	... horn
„	last	conjunctivia ...	... conjunctiva
45	30	said to do ...	... said to be
„	35	saints ...	... saints and seers
„	44	revolution ...	... voice-box
46	7	waves ...	... waves
„	11	as ...	... "as
„	16	Æther ...	... æther
„	18	Personality ...	... Personality:
„	27	all there ...	... all these
„	29	spermotozoa ...	... spermatozoa
„	34	reminismscences	... reminiscences
47	33	ineritia ...	... inertia
48	5	With ...	... "With
„	13	constraint. "Through	... constraint, "through
„	17	velocity ...	... a velocity,
„	„	eccentricity ...	... eccentricity,
„	37	fraction ...	... fractions
„	48	stress ...	... stress relations can never be regarded as more than crude analogies,
49	10	The realisation	... This realisation
„	16	his conception ...	... this conception
„	36	revelation ...	... revelation
„	38	Mahat ...	... Mahat,
50	9	hights ...	... heights
„	16	exepting ...	... excepting
„	30	stirring ...	... stirring
„	39	days ...	... days,
„	49	is. The ...	... is the.
51	12	Philosophy ...	... Philosophy"
„	22	senses, and how big the world of our senses.	... senses,
„	38	effects ...	... effects of
52	4	proved ...	... prone
„	11	pesition ...	... position
„	24	was ...	... which was
„	41	of Cell ...	... of the Cell
53	25	work ...	... Work
„	28	atma ...	... Atma
„	32	become ...	... becomes
„	37	Quarters ...	... the Quarters.
54	17	Uttarayana; the	... Uttarayana, (
„	18	orthwards, ...	... northwards),
„	20	lightening ...	... lightning
55	5	but in ...	... but in the
„	26&27	wouderous ...	... wondrous
„	29	Impersonal. "The	... Impersonal" the
„	45	invisible, ...	... invisible;
56	2	position, ...	... position ;
„	17	Stint ...	... stint
„	22	dimensional ...	... *n*-dimensional

Page	Line	Incorrect	Correct.
56	27	pseude ...	... pseudo
„	34	tearing. ...	... tearing;
„	last	Point ...	... Point,
57	12	Truth, Beauty... and goodness	... Truth, Beauty and Goodness (Similar mistakes else where as to Capitals)
„	20	system ...	... systems
„	21	reserved ...	... reversed
„	24&25	Co 2 ...	... Co ½ 2
„	31	Voccine-therapy	... Vaccine-therapy
58	8	Reason?" ...	... Reason"?
„	9	nullity?" ...	... nullity"?
„	45	"Freedom" ...	... Freedom"
„	47	injustice, ...	... injustice ;
60	20	the ...	... this
„	24	Spinx ...	... Sphinx
„	38	himself ...	... himself"
„	40	the remains ...	... "the remains
61	32	does ...	... "does
„	33	Ben Nevis ...	... Ben Nevis"
„	48	in the air tubes	... the air tubes
62	4	amiuo-acids ...	... amino-acids
„	9	see ...	... sees
„	12	bondmen ...	... hodmen
„	34	24 ...	... 24)
63	50	is every countary	... in every country
64	3	Fzekiel ...	... Ezekiel
„	22	Sanctury ...	... Sanctuary
„	28	that the ...	... "that the
„	39	pirations ...	... aspirations
„	43	sr ...	... or
65	4	This ...	... "This
„	26	together ...	... together'
„	32	arms ...	... arms"
„	38	nebulæ ...	... nebulæ:
66	1	on ...	... no
„	29	being ...	... Being
67	25	little ...	... little Earth
68	50	Liquiss ...	... Liquid
69	16	meditator ...	... mediator
„	41	rise to the ...	... rise to the Categories of Reflection, the

N. B.—In the several places separate Paragraphs have been mixed up and printed together, in othere separate Paragraphs appear where there were none in the original. These mistakes and mistakes as to Capitals and Italics and as to punctuation etc. have not been shown in the Errata except occasionally. The reader will kindly pardon them. He is requested to kindly insert the words shown in the Errata as omitted.

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